

SECTION I

CLOSURE AND POST-CLOSURE PLANS AND FINANCIAL REQUIREMENTS

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
SECTION I – CLOSURE POST-CLOSURE PLANS AND FINANCIAL REQUIREMENTS	1
I-1 CLOSURE PLANS [40 <i>Code of Federal Regulations</i> {CFR} §270.14(b)(13)]	1
I-1a Closure Performance Standard [40 CFR §270.14(b)(13) and 264.111]	1
I-1b Time and Activities Required for Partial Closure and Final Closure Activities [40 CFR §270.14(b)(13) and 264.112(b)(1) through 264.112(b)(7)]	1
I-1c Maximum Waste Inventory [40 CFR §270.14(b)(13) and 264.112(b)(3)]	2
I-1d Schedule for Closure [40 CFR §270.14(b)(13) and 264.112(b)(6)]	2
I-1d(1) Time Allowed for Closure [40 CFR §270.14(b)(13), 264.112(b)(2) and 264.113(a) and (b)]	2
I-1d(1)(a) Extension for Closure Time [40 CFR §270.14(b)(13) and 264.113(a) and (b)]	2
I-1e Closure Procedures [40 CFR §270.14(b)(13), 264.112 (with the exception of the modification noted in KAR 28-31-264), and 264.114]	2
I-1e(1) Inventory Removal [40 CFR §270.14(b)(13) and 264.112(b)(3)]	3
I-1e(2) Disposal or Decontamination of Equipment, Structure and Soils [40 CFR §270.14(b)(13), 264.112(b)(4), and 264.114]	3
I-1e(3) Closure of Disposal Units/Contingent Closures [40 CFR §270.14(b)(13)]	3
I-1e(3)(a) Disposal Impoundments [40 CFR §270.14(b)(13) and 264.228(a)(2)]	3
I-1e(3)(a)(i) Elimination of Liquids [40 CFR §270.14(b)(13)]	3
I-1e(3)(a)(ii) Waste Stabilization [40 CFR §270.14(b)(13) and 264.228(a)(2)(ii)]	3
I-1e(3)(b) Cover Design [40 CFR §270.14(b)(13), 264.228(a)(2)(iii), and 264.310(a)]	3
I-1e(3)(c) Minimization of Liquid Migration [40 CFR §270.14(b)(13), 264.228(a)(2)(iii)(A), and 264.310(a)(1)]	3
I-1e(3)(d) Maintenance Needs [40 CFR §270.14(b)(13), 264.228(a)(2)(iii)(B), and 264.310(a)(2)]	3
I-1e(3)(e) Drainage and Erosion [40 CFR §270.14(b)(13), 264.228(a)(2)(iii)(C), and 264.310(a)(3)]	3
I-1e(3)(f) Settlement and Subsidence [40 CFR §270.14(b)(13), 264.228(a)(2)(iii)(D), and 264.310(a)(4)]	4
I-1e(3)(g) Cover Permeability [40 CFR §270.14(b)(13), 264.228(a)(2)(iii)(E), and 264.310(a)(5)]	4
I-1e(3)(h) Freeze/Thaw Effects [40 CFR §270.14(b)(13), 264.228(a)(2)(iii), and 264.310(a)]	4
I-1e(4) Closure of Containers [40 CFR §270.14(b)(13), 264.178, and 264.112(b)(3)]	4
I-1e(5) Closure of Tanks [40 CFR §270.14(b)(13), 264.197, and 264.112(b)(3)]	4
I-1e(6) Closure of Waste Piles [40 CFR §270.14(b)(13), 270.18(h), and 264.258]	4

I-1e(7)	Closure of Surface Impoundments [40 CFR §270.14(b)(13), 270.17(f), 264.228(a)(1), (2) and (b)]	4
I-1e(8)	Closure of Incinerators [40 CFR §270.14(b)(13) and 264.351]	4
I-1e(9)	Closure of Landfills [40 CFR §270.14(b)(13), 270.21(e), and 264.310(a)].....	4
I-1e(10)	Closure of Land Treatment Facilities [40 CFR §270.14(b)(13), 264.280(a), and 270.20(f)].....	4
I-1e(10)(a)	Continuance of Treatment [40 CFR §270.14(b)(13), 264.280(a)(1) through (7)].....	4
I-1e(10)(b)	Vegetative Cover [40 CFR §270.14(b)(13), 270.20(f), and 264.280(a)(8)]	5
I-1e(11)	Closure of Miscellaneous Units [40 CFR §270.14(b)(13) and 270.23(a)(2)]	5
I-1e(12)	Closure of Boilers and Industrial Furnaces [40 CFR §270.14(b)(13) and 266.102(a)(2)(vii)]	5
I-1e(13)	Closure of Containment Buildings [40 CFR §270.14(b)(13) and 264.1102]	5
I-2	POST-CLOSURE PLANS [40 CFR §270.14(b)(13)]	5
I-2a	Inspection Plan [40 CFR §270.14(b)(13), 264.118(a), 264.197(b), 264.197(c)(2), 264.226(d)(2), 264.228(b), 264.228(c)(1)(ii), 264.258(b), 264.258(c)(1)(ii), 264.303(c) and 264.310(b)]	5
I-2b	Monitoring Plan [40 CFR §270.14(b)(13), 264.118(b)(1), 264.197(b), 264.197(c)(2), 264.226(d)(2), 264.228(b), 264.228(c)(1)(ii), 264.258(b), 264.258(c)(1)(ii), 264.303(c) and 264.310(b)]	5
I-2c	Maintenance Plan [40 CFR §270.14(b)(13), 264.118(b)(2), 264.197(b), 264.197(c)(2), 264.226(d)(2), 264.228(b), 264.228(c)(1)(ii), 264.258(b), 264.258(c)(1)(ii) and 264.310(b)]	5
I-2d	Land Treatment [40 CFR §270.14(b)(13) and 264.280(c)]	6
I-2e	Post-Closure Care for Miscellaneous Units [40 CFR §270.14(b)(13), 270.23(a) and 264.603].....	6
I-2f	Post-Closure Security [40 CFR §270.14(b)(13) and 264.117(b) and (c)].....	6
I-2g	Post-Closure Contact [40 CFR §270.14(b)(13) and 264.118(b)(3)].....	6
I-3	NOTICES REQUIRED FOR DISPOSAL [40 CFR §270.14(b)(13)]	6
I-3a	Certification of Closure [40 CFR §270.14(b)(13), 264.115 and 264.280]	6
I-3b	Survey Plat [40 CFR §270.14(b)(13) and 264.116].....	6
I-3c	Post-Closure Certification [40 CFR §270.14(b)(13) and 264.120]	7
I-3d	Post-Closure Notices [40 CFR §270.14(b)(13), 270.14(b)(14) and 264.119]	7
I-4	CLOSURE COST ESTIMATE [40 CFR §270.14(b)(15) and 264.142]	7
I-5	FINANCIAL ASSURANCE FOR CLOSURE [40 CFR §270.14(b)(15), 264.143, and 264.151(with the exception of the modifications noted in KAR 28-31-264)]	7
I-5a	Closure Trust Fund [40 CFR §270.14(b)(15), 264.143(a) and 264.151(a)(1) (C)	7

I-5b	Surety Bond [40 CFR §270.14(b)(15), 264.143(b),(c) and 264.151(b),(c) (with the exception of the modifications noted in KAR 28-31-264)]	7
I-5b(1)	Surety Bond Guaranteeing Payment into a Closure Trust fund [40 CFR §270.14(b)(15), 264.143(b) and 264.151(b) (with the exception of the modifications noted in KAR 28-31-264)]	7
I-5b(2)	Surety bond Guaranteeing Performance of Closure [40 CFR §270.14(b)(15), 264.143(c) and 264.151(c) (with the exception of the modifications noted in KAR 28-31-264)]	7
I-5c	Closure Letter of Credit [40 CFR §270.14(b)(15), 264.143(d) and 264.151(d) (with the exception of the modifications noted in KAR 28-31-264)]	7
I-5d	Closure Insurance [40 CFR §270.14(b)(15), 264.143(e) (with the exception of the modifications noted in KAR 28-31-264), and 264.151(e)]	8
I-5e	Financial Test and Corporate Guarantee for Closure [40 CFR §270.14(b)(15), 264.143(f) and 264.151(f),(h) (with the exception of the modifications noted in KAR 28-31-264)]	8
I-5f	Use of Multiple Financial Mechanism [40 CFR §270.14(b)(15) and 264.143(g)]	8
I-5g	Use of Multiple Financial Mechanism for Multiple Facilities [40 CFR §270.14(b)(15) and 264.143(h) (with the exception of the modifications noted in KAR 28-31-264)]	8
I-6	POST-CLOSURE COST ESTIMATE [40 CFR §270.14(b)(16) and 264.144 (with the exception of the modifications noted in KAR 28-31-264)]	8
I-7	FINANCIAL ASSURANCE MECHANISM FOR POST CLOSURE CARE [40 CFR §270.14(b)(16), 264.145 and 264.151 (with the exception of the modifications noted in KAR 28-31-264)]	8
I-7a	Post-Closure Trust Fund [40 CFR §270.14(b)(16), 264.145(a) and 264.151(a)(1) (with the exception of the modifications noted in KAR 28-31-264)]	8
I-7b	Surety Bond [40 CFR §270.14(b)(16), 264.145(b),(c) and 264.151(b)(c) (with the exception of the modifications noted in KAR 28-31-264)]	8
I-7b(1)	Surety Bond Guaranteeing Payment into a Post-Closure Trust Fund [40 CFR §270.14(b)(16), 264.145(b) and 264.151(b) (with the exception of the modifications noted in KAR 28-31-264)]	8
I-7b(2)	Surety Bond Guaranteeing Performance of Closure [40 CFR §270.14(b)(16), 264.145(c) and 264.151(c) (with the exception of the modifications noted in KAR 28-31-264)]	8
I-7c	Post-Closure Letter of Credit [40 CFR §270.14(b)(16), 264.145(d) and 264.151(d) (with the exception of the modifications noted in KAR 28-31-264)]	9
I-7d	Post-Closure Insurance [40 CFR §270.14(b)(16), 264.145(e) (with the exception of the modifications noted in KAR 28-31-264), and 264.151(e)]	9
I-7e	Financial Test and Corporate Guarantee for Post-Closure Care [40 CFR §270.14(b)(16), 264.145(f) and 264.151(f),(h) (with the exception of the modifications noted in KAR 28-31-264)]	9
I-7f	Use of Multiple Financial Mechanism [40 CFR §270.14(b)(16) and 264.145(g)]	9

I-7g	Use of Multiple Financial Mechanism for Multiple Facilities [40 CFR §270.14(b)(16) and 264.145(h)].....	9
I-8	LIABILITY REQUIREMENTS [40 CFR §270.14(b)(17) and 264.147 (with the exception of the modifications noted in KAR 28-31-264)]	9
I-8a	Coverage for Sudden Accidental Occurrences [40 CFR §270.14(b)(17) and 264.147(a) (with the exception of the modifications noted in KAR 28-31-264)].....	9
I-8a(1)	Endorsement of Certification [40 CFR §270.14(b)(17) and 264.147(a)(1) (with the exception of the modifications noted in KAR 28-31-264)].....	9
I-8a(2)	Financial Test and Corporate Guarantee for Liability Coverage [40 CFR §270.14(b)(17), 264.147(a)(2)(f),(g) and 264.151(f),(g) (with the exception of the modifications noted in KAR 28-31-264)].....	9
I-8a(3)	Use of Multiple Financial Mechanism [40 CFR §270.14(b)(17) and 264.147(a)(3)]	9
I-8b	Coverage for No Sudden Accidental Occurrences [40 CFR §270.14(b)(17) and 264.147(b) (with the exception of the modifications noted in KAR 28-31-264)].....	10
I-8b(1)	Endorsement of Certification [40 CFR §270.14(b)(17) and 264.147(b)(1) (with the exception of the modifications noted in KAR 28-31-264)].....	10
I-8b(2)	Financial Test or Corporate Guarantee for Liability Coverage [40 CFR §270.14(b)(17), 264.147(b)(2) and 264.151(f),(g) (with the exception of the modifications noted in KAR 28-31-264)]	10
I-8b(3)	Use of Multiple Insurance Mechanism [40 CFR §270.14(b)(17) and 264.147(b)(3)]	10
I-8c	Requests for Variance [40 CFR §270.14(b)(17) and 264.147(c)]	10
I-9	USE OF STATE REQUIRED MECHANISMS [40 CFR §270.14(b)(18)]	10
I-9a	Use of State Required Mechanisms [40 CFR §270.14(b)(18) and 264.149]	10
I-9b	State Assumption of Responsibility [40 CFR §270.14(b)(18) and 264.150]	10

TABLES

Table

- I-1 MAXIMUM HAZARDOUS WASTE CONTAINER STORAGE UNIT CAPACITIES FOR HW STORAGE STRUCTURES

APPENDICES

Appendix

- I-1 HAZARDOUS WASTE STORAGE UNITS CLOSURE PLAN
- I-2 OPEN DETONATION GROUNDS CLOSURE PLAN
- I-3 FINANCIAL GUARANTEE BOND
- I-4 EXECUTED TRUST AGREEMENT
- I-5 INSURANCE CERTIFICATE
- I-6 CHECKLIST FOR REVIEW OF FEDERAL RCRA PERMIT APPLICATION

SECTION I – CLOSURE POST-CLOSURE PLANS AND FINANCIAL REQUIREMENTS

I-1 CLOSURE PLANS [40 Code of Federal Regulations {CFR} §270.14(b)(13)]

Day and Zimmermann Kansas LLC (D&Z) has prepared closure plans for the hazardous waste management units, including one closure plan to address the 12 container storage units (see Appendix I-1), and one closure plan to address the open detonation (OD) grounds (see Appendix I-2). Both plans identify the maximum waste inventory, documentation procedures, and a closure schedule for their respective hazardous waste management units. Section B-1 and Figures B-4, B-5, and B-6 of this permit application show locations of the hazardous waste management units. Sections D-1 and D-8 and Figures D-1 through D-9 describe and illustrate locations of equipment and structures associated with the hazardous waste management units.

I-1a Closure Performance Standard [40 CFR §270.14(b)(13) and 264.111]

Closure plans for the D&Z hazardous waste management units are designed to conform to the closure requirements in 40 CFR §270.14(b)(13) and 264.111, including the following:

- Minimize need for continuing maintenance (i.e., post-closure maintenance).
- During closure activities, control, minimize, or eliminate, to the extent necessary to protect human health and the environment, post-closure excavation of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products such that none of these are left on/in the ground, in surface waters, or in the atmosphere.

The closure performance standard applies a risk-based approach to meet non-residential remediation goals established for the facility under the corrective action program (Section J). In addition, land use controls (LUC) will be imposed for hazardous waste management areas covered under this permit to ensure only non-residential use of these areas after closure.

D&Z will maintain copies of the closure plans for the hazardous waste management units until closure is completed and certified. If changes in operating plans or facility design affect the closure plans, the closure plans will be amended in accordance with the provisions of 40 CFR §264.112, with the exception of the modification noted in KAR 28-31-264. D&Z will be responsible for expanding upon and updating the facility's closure plans when revisions are necessary due to changes in the operations, facility design, and/or closure schedule. KDHE and U.S. Environmental Protection Agency (USEPA) Region VII will be notified at least 45 days prior to the date closure activities are scheduled to begin. All closure activities will be completed within 180 days after the closing units receive the final volume of hazardous waste for treatment or storage.

Within 60 days of completion of closure activities, D&Z and an independent registered Professional Engineer will certify that closure of the hazardous waste management units and OD grounds was completed in accordance with specifications in the approved closure plans and with 40 CFR §264.115. This certification will be forwarded to KDHE and the USEPA Regional Administrator.

I-1b Time and Activities Required for Partial Closure and Final Closure Activities [40 CFR §270.14(b)(13) and 264.112(b)(1) through 264.112(b)(7)]

Active hazardous waste container storage will occur in Igloos 1934, 1935, 1936, 1942, 1967, 1969, 1970, and 1979. Magazine 1816 will also be used for storage of solid hazardous waste.

Partial closure requirements do not apply to the OD grounds, as the entire area of the OD grounds will be closed at the same time. This will include those areas that may have been impacted by past thermal treatment and/or disposal operations.

I-1c Maximum Waste Inventory [40 CFR §270.14(b)(13) and 264.112(b)(3)]

See Table I-1 for a listing of the maximum hazardous waste capacity of the hazardous waste container storage units.

Waste ordnance and munitions are neither stored nor accumulated at the OD grounds. Because ordnance and munitions are transported to the OD grounds on the day they are to be treated, there will be no inventory of such materials at the OD grounds at closure. The maximum daily inventory of explosive material subject to treatment at the OD grounds is limited by performance standards for the OD grounds. A maximum 2,000 pounds of materials (including donor) may be detonated per day. No hazardous wastes result from detonation activities. Shrapnel generated as a result of detonation activities is collected after each detonation event and sold as scrap metal.

I-1d Schedule for Closure [40 CFR §270.14(b)(13) and 264.112(b)(6)]

Closure shall commence after the 45-day notification period required by 40 CFR §264.112(c). See the closure plans, Appendix I-1 and I-2, for the planned schedule for closure of the hazardous waste management units and the OD grounds.

I-1d(1) Time Allowed for Closure [40 CFR §270.14(b)(13), 264.112(b)(2) and 264.113(a) and (b)]

Closure activities for the hazardous waste container storage units will begin no later than 30 days after receipt of the final volume of hazardous wastes. All hazardous waste maintained in the hazardous waste container storage units will be removed and properly disposed of within 90 days after reception of the final volume of hazardous waste. Closure activities will be completed within 180 days after reception of the final volume of hazardous waste.

For the OD grounds, the extent of activities necessary to fully close the unit will not be known until closure activities determine whether hazardous waste or hazardous waste constituents have been released to the environment, and the nature and extent of these in soils and groundwater. D&Z intends to clean close the unit for unrestricted use or for restricted use (industrial use only). D&Z acknowledges that if it is not possible to remove all hazardous waste or hazardous waste constituents to risk-based standards, the unit will become subject to post-closure requirements. The closure schedule will depend on this determination.

I-1d(1)(a) Extension for Closure Time [40 CFR §270.14(b)(13) and 264.113(a) and (b)]

If an extension to a closure schedule is needed, D&Z will comply with all applicable requirements for requesting an appropriate permit modification to accommodate the extension.

I-1e Closure Procedures [40 CFR §270.14(b)(13), 264.112 (with the exception of the modification noted in KAR 28-31-264), and 264.114]

Details of the closure procedures are in the hazardous waste container storage units closure plan (Appendix I-1) and the OD grounds closure plan (Appendix I-2).

I-1e(1) Inventory Removal [40 CFR §270.14(b)(13) and 264.112(b)(3)]

Closure activities in the container storage areas will include container removal. All hazardous waste and materials in inventory will be removed to a State and/or USEPA permitted treatment, storage, and/or disposal facility (TSDF) or recycling facility in accordance with the approved closure plan.

Waste ordnance and munitions are neither stored nor accumulated at the OD grounds. Because these energetic materials are transported to the OD grounds on the day of treatment and treated on that day, there will be no inventory of such materials at the OD grounds at closure.

I-1e(2) Disposal or Decontamination of Equipment, Structure and Soils [40 CFR §270.14(b)(13), 264.112(b)(4), and 264.114]

Hazardous waste management unit equipment, structures, and soils will be disposed of or decontaminated in accordance with the approved closure plans in Appendix I-1 through I-2. These activities will also meet the closure performance standards and will be implemented in accordance with the approved closure plans.

I-1e(3) Closure of Disposal Units/Contingent Closures [40 CFR §270.14(b)(13)]

Not applicable.

I-1e(3)(a) Disposal Impoundments [40 CFR §270.14(b)(13) and 264.228(a)(2)]

Not applicable.

I-1e(3)(a)(i) Elimination of Liquids [40 CFR §270.14(b)(13)]

Not applicable.

I-1e(3)(a)(ii) Waste Stabilization [40 CFR §270.14(b)(13) and 264.228(a)(2)(ii)]

Not applicable.

I-1e(3)(b) Cover Design [40 CFR §270.14(b)(13), 264.228(a)(2)(iii), and 264.310(a)]

Not applicable.

I-1e(3)(c) Minimization of Liquid Migration [40 CFR §270.14(b)(13), 264.228(a)(2)(iii)(A), and 264.310(a)(1)]

Not applicable.

I-1e(3)(d) Maintenance Needs [40 CFR §270.14(b)(13), 264.228(a)(2)(iii)(B), and 264.310(a)(2)]

Not applicable.

I-1e(3)(e) Drainage and Erosion [40 CFR §270.14(b)(13), 264.228(a)(2)(iii)(C), and 264.310(a)(3)]

Not applicable.

I-1e(3)(f) Settlement and Subsidence [40 CFR §270.14(b)(13), 264.228(a)(2)(iii)(D), and 264.310(a)(4)]

Not applicable.

I-1e(3)(g) Cover Permeability [40 CFR §270.14(b)(13), 264.228(a)(2)(iii)(E), and 264.310(a)(5)]

Not applicable.

I-1e(3)(h) Freeze/Thaw Effects [40 CFR §270.14(b)(13), 264.228(a)(2)(iii), and 264.310(a)]

Not applicable.

I-1e(4) Closure of Containers [40 CFR §270.14(b)(13), 264.178, and 264.112(b)(3)]

Closure activities for the hazardous waste container storage units are detailed in the closure plan included as Appendix I-1. Any inventory of stored wastes will be removed and disposed of in accordance with the approved plan. The hazardous waste container storage units include structures, and removal and/or decontamination of the structures will accord with the approved closure plan, will meet the closure performance standard, and will accord with the approved closure plan. See Appendix I-1 for a listing of the hazardous waste container storage units, and a description of the planned closure activities.

I-1e(5) Closure of Tanks [40 CFR §270.14(b)(13), 264.197, and 264.112(b)(3)]

Not applicable.

I-1e(6) Closure of Waste Piles [40 CFR §270.14(b)(13), 270.18(h), and 264.258]

Not applicable.

I-1e(7) Closure of Surface Impoundments [40 CFR §270.14(b)(13), 270.17(f), 264.228(a)(1), (2) and (b)]

Not applicable.

I-1e(8) Closure of Incinerators [40 CFR §270.14(b)(13) and 264.351]

Not applicable.

I-1e(9) Closure of Landfills [40 CFR §270.14(b)(13), 270.21(e), and 264.310(a)]

Not applicable.

I-1e(10) Closure of Land Treatment Facilities [40 CFR §270.14(b)(13), 264.280(a), and 270.20(f)]

Not applicable.

I-1e(10)(a) Continuance of Treatment [40 CFR §270.14(b)(13), 264.280(a)(1) through (7)]

Not applicable.

I-1e(10)(b) Vegetative Cover [40 CFR §270.14(b)(13), 270.20(f), and 264.280(a)(8)]

Not applicable.

I-1e(11) Closure of Miscellaneous Units [40 CFR §270.14(b)(13) and 270.23(a)(2)]

Closure activities for the OD grounds are detailed in the OD closure plan in Appendix I-2. All ordnance and explosives (OE)/munitions and explosives of concern (MEC) will be removed so the OD unit can be safely investigated. Closure activities will include collection of soil samples from within each detonation pit to a depth of 8 to 10 feet, and of surface soils (0-2 feet below ground surface [bgs]) outside the pits to verify that no soil contamination at concentrations exceeding site-specific remediation goals in the Corrective Measure Decision (CMD) document are present at the OD grounds. If soils are identified with contaminant concentrations above remediation goals, those soils will be removed for off-site disposal. See Appendix I-2 for a description of the planned closure activities, including inventory removal, OE/MEC removal and/or decontamination, and soil investigation.

I-1e(12) Closure of Boilers and Industrial Furnaces [40 CFR §270.14(b)(13) and 266.102(a)(2)(vii)]

Not applicable.

I-1e(13) Closure of Containment Buildings [40 CFR §270.14(b)(13) and 264.1102]

Not applicable.

I-2 POST-CLOSURE PLANS [40 CFR §270.14(b)(13)]

Post-closure plans are required for disposal units where residues will remain at the unit after closure. D&Z intends to clean close the hazardous waste management and treatment units. If hazardous waste or waste constituents cannot be removed from the hazardous waste management and treatment units in order to meet remedial goals at closure, a post-closure plan will be prepared and submitted to KDHE for review and approval at that time.

I-2a Inspection Plan [40 CFR §270.14(b)(13), 264.118(a), 264.197(b), 264.197(c)(2), 264.226(d)(2), 264.228(b), 264.228(c)(1)(ii), 264.258(b), 264.258(c)(1)(ii), 264.303(c) and 264.310(b)]

Not applicable.

I-2b Monitoring Plan [40 CFR §270.14(b)(13), 264.118(b)(1), 264.197(b), 264.197(c)(2), 264.226(d)(2), 264.228(b), 264.228(c)(1)(ii), 264.258(b), 264.258(c)(1)(ii), 264.303(c) and 264.310(b)]

Not applicable.

I-2c Maintenance Plan [40 CFR §270.14(b)(13), 264.118(b)(2), 264.197(b), 264.197(c)(2), 264.226(d)(2), 264.228(b), 264.228(c)(1)(ii), 264.258(b), 264.258(c)(1)(ii) and 264.310(b)]

Not applicable.

I-2d Land Treatment [40 CFR §270.14(b)(13) and 264.280(c)]

Not applicable.

I-2e Post-Closure Care for Miscellaneous Units [40 CFR §270.14(b)(13), 270.23(a) and 264.603]

Not applicable.

I-2f Post-Closure Security [40 CFR §270.14(b)(13) and 264.117(b) and (c)]

Not applicable.

I-2g Post-Closure Contact [40 CFR §270.14(b)(13) and 264.118(b)(3)]

Not applicable.

I-3 NOTICES REQUIRED FOR DISPOSAL [40 CFR §270.14(b)(13)]

The hazardous waste management and treatment units currently operating at D&Z are not disposal facilities. Therefore, these requirements do not apply.

I-3a Certification of Closure [40 CFR §270.14(b)(13), 264.115 and 264.280]

Within 60 days of completion of closure of the hazardous waste management and treatment units, D&Z will provide KDHE, by registered mail, notification that the units have been closed in accordance with the specifications of the approved closure plans. The certification will be signed by the Administrative Contracting Officer and by an independent, registered Kansas professional engineer. Documentation supporting the engineer's certification will be furnished in a closure certification report. The report will present the following information:

- Description of sampling plan implementation and decisions
- Description of remediation decisions and activities, if any
- Description of verification sampling plan implementation and decisions, if any
- Data analysis and presentation (data posting on a map, contour plotting, tables), and if any, figures showing locations of remediation areas
- Sampling and analysis documentation
- Statistical analyses performed, and presentation of representative calculations
- Certification by an independent registered professional engineer that closure is completed in accordance with the approved closure plans, facility permit, and relevant regulations.

I-3b Survey Plat [40 CFR §270.14(b)(13) and 264.116]

At the time of unit closure, if contamination is left in place, a survey plat indicating location and dimensions of the unit relative to permanently surveyed benchmarks will be submitted to KDHE. The plat will be prepared and certified by a professional land surveyor, and will contain a note, prominently

displayed, stating the owner/operator obligation to restrict disturbance of the disposal unit in accordance with the applicable 40 CFR Subpart G regulations.

I-3c Post-Closure Certification [40 CFR §270.14(b)(13) and 264.120]

A post-closure certification is required for disposal units where residues will remain at the site after closure. Because D&Z intends to clean close the hazardous waste management and treatment units, post-closure certification is not applicable.

I-3d Post-Closure Notices [40 CFR §270.14(b)(13), 270.14(b)(14) and 264.119]

Not applicable.

I-4 CLOSURE COST ESTIMATE [40 CFR §270.14(b)(15) and 264.142]

Closure cost estimates for the D&Z hazardous waste management and treatment units have been prepared in accordance with 40 CFR §264.142, and are included in the closure plans in Appendix I-1 and I-2.

I-5 FINANCIAL ASSURANCE FOR CLOSURE [40 CFR §270.14(b)(15), 264.143, and 264.151(with the exception of the modifications noted in KAR 28-31-264)]

Once the closure cost estimate is approved, D&Z will establish financial assurance for closure of the units.

I-5a Closure Trust Fund [40 CFR §270.14(b)(15), 264.143(a) and 264.151(a)(1) (C

Not applicable

I-5b Surety Bond [40 CFR §270.14(b)(15), 264.143(b),(c) and 264.151(b),(c) (with the exception of the modifications noted in KAR 28-31 264)]

A copy of the surety bond to meet these requirements is found in Appendix I-3.

I-5b(1) Surety Bond Guaranteeing Payment into a Closure Trust fund [40 CFR §270.14(b)(15), 264.143(b) and 264.151(b) (with the exception of the modifications noted in KAR 28-31-264)]

A copy of the information on the trust fund for the surety bond to meet these requirements is found in Appendix I-4.

I-5b(2) Surety bond Guaranteeing Performance of Closure [40 CFR §270.14(b)(15), 264.143(c) and 264.151(c) (with the exception of the modifications noted in KAR 28-31-264)]

Not applicable.

I-5c Closure Letter of Credit [40 CFR §270.14(b)(15), 264.143(d) and 264.151(d) (with the exception of the modifications noted in KAR 28-31-264)]

Not applicable.

I-5d Closure Insurance [40 CFR §270.14(b)(15), 264.143(e) (with the exception of the modifications noted in KAR 28-31-264), and 264.151(e)]

Not applicable.

I-5e Financial Test and Corporate Guarantee for Closure [40 CFR §270.14(b)(15), 264.143(f) and 264.151(f),(h) (with the exception of the modifications noted in KAR 28-31-264)]

Not applicable.

I-5f Use of Multiple Financial Mechanism [40 CFR §270.14(b)(15) and 264.143(g)]

Not applicable.

I-5g Use of Multiple Financial Mechanism for Multiple Facilities [40 CFR §270.14(b)(15) and 264.143(h) (with the exception of the modifications noted in KAR 28-31-264)]

Not applicable.

I-6 POST-CLOSURE COST ESTIMATE [40 CFR §270.14(b)(16) and 264.144 (with the exception of the modifications noted in KAR 28-31-264)]

Not applicable.

I-7 FINANCIAL ASSURANCE MECHANISM FOR POST CLOSURE CARE [40 CFR §270.14(b)(16), 264.145 and 264.151 (with the exception of the modifications noted in KAR 28-31-264)]

Not applicable

I-7a Post-Closure Trust Fund [40 CFR §270.14(b)(16), 264.145(a) and 264.151(a)(1) (with the exception of the modifications noted in KAR 28-31-264)]

Not applicable

I-7b Surety Bond [40 CFR §270.14(b)(16), 264.145(b),(c) and 264.151(b)(c) (with the exception of the modifications noted in KAR 28-31-264)]

Not applicable

I-7b(1) Surety Bond Guaranteeing Payment into a Post-Closure Trust Fund [40 CFR §270.14(b)(16), 264.145(b) and 264.151(b) (with the exception of the modifications noted in KAR 28-31-264)]

Not applicable

I-7b(2) Surety Bond Guaranteeing Performance of Closure [40 CFR §270.14(b)(16), 264.145(c) and 264.151(c) (with the exception of the modifications noted in KAR 28-31-264)]

Not applicable

I-7c Post-Closure Letter of Credit [40 CFR §270.14(b)(16), 264.145(d) and 264.151(d) (with the exception of the modifications noted in KAR 28-31-264)]

Not applicable

I-7d Post-Closure Insurance [40 CFR §270.14(b)(16), 264.145(e) (with the exception of the modifications noted in KAR 28-31-264), and 264.151(e)]

Not applicable

I-7e Financial Test and Corporate Guarantee for Post-Closure Care [40 CFR §270.14(b)(16), 264.145(f) and 264.151(f),(h) (with the exception of the modifications noted in KAR 28-31-264)]

Not applicable

I-7f Use of Multiple Financial Mechanism [40 CFR §270.14(b)(16) and 264.145(g)]

Not applicable

I-7g Use of Multiple Financial Mechanism for Multiple Facilities [40 CFR §270.14(b)(16) and 264.145(h)]

Not applicable

I-8 LIABILITY REQUIREMENTS [40 CFR §270.14(b)(17) and 264.147 (with the exception of the modifications noted in KAR 28-31-264)]

I-8a Coverage for Sudden Accidental Occurrences [40 CFR §270.14(b)(17) and 264.147(a) (with the exception of the modifications noted in KAR 28-31-264)]

A copy of the insurance certificate to meet these requirements is found in Appendix I-5.

I-8a(1) Endorsement of Certification [40 CFR §270.14(b)(17) and 264.147(a)(1) (with the exception of the modifications noted in KAR 28-31-264)]

A copy of the insurance certificate to meet these requirements is found in Appendix I-5.

I-8a(2) Financial Test and Corporate Guarantee for Liability Coverage [40 CFR §270.14(b)(17), 264.147(a)(2)(f),(g) and 264.151(f),(g) (with the exception of the modifications noted in KAR 28-31-264)]

Not applicable

I-8a(3) Use of Multiple Financial Mechanism [40 CFR §270.14(b)(17) and 264.147(a)(3)]

Not applicable

I-8b Coverage for No Sudden Accidental Occurrences [40 CFR §270.14(b)(17) and 264.147(b) (with the exception of the modifications noted in KAR 28-31-264)]

Not applicable

I-8b(1) Endorsement of Certification [40 CFR §270.14(b)(17) and 264.147(b)(1) (with the exception of the modifications noted in KAR 28-31-264)]

Not applicable

I-8b(2) Financial Test or Corporate Guarantee for Liability Coverage [40 CFR §270.14(b)(17), 264.147(b)(2) and 264.151(f),(g) (with the exception of the modifications noted in KAR 28-31-264)]

Not applicable

I-8b(3) Use of Multiple Insurance Mechanism [40 CFR §270.14(b)(17) and 264.147(b)(3)]

Not applicable

I-8c Requests for Variance [40 CFR §270.14(b)(17) and 264.147(c)]

Not applicable

I-9 USE OF STATE REQUIRED MECHANISMS [40 CFR §270.14(b)(18)]

Not applicable

I-9a Use of State Required Mechanisms [40 CFR §270.14(b)(18) and 264.149]

Not applicable

I-9b State Assumption of Responsibility [40 CFR §270.14(b)(18) and 264.150]

Not applicable

TABLES

TABLE I-1**MAXIMUM HAZARDOUS WASTE CONTAINER STORAGE UNIT CAPACITIES
FOR HW STORAGE STRUCTURES**

Storage Facility	Estimated Number of 55-gallon Containers to be Stored in Facility	Capacity of Containers to be Stored (Gallons)	Spill Capacity Provided (Gallons)
1816	2,160	118,800	NA
1934	320	17,600	NA
1935	320	17,600	NA
1936	320	17,600	3,500
1942	320	17,600	3,500
1967	320	17,600	3,500
1969	320	17,600	3,500
1970	320	17,600	3,500
1979	320	17,600	3,500
2707	8	440	56
2708	8	440	56
2709	8	440	56

Notes:

HW Hazardous waste
NA Not applicable, no liquid waste stored at this unit.

APPENDICES

APPENDIX I-1

HAZARDOUS WASTE STORAGE UNITS CLOSURE PLAN

**CLOSURE PLAN
CLOSURE OF RCRA PERMITTED HAZARDOUS WASTE STORAGE FACILITIES**

Revision 02

April 2015

**Prepared for
DAY & ZIMMERMANN KANSAS LLC**



Prepared by:

**Tetra Tech, Inc.
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CONTENTS

<u>Section</u>	<u>Page</u>
ACRONYMS AND ABBREVIATIONS	iii
1 INTRODUCTION	1
2 PURPOSE.....	3
3 FACILITY DESCRIPTION	4
3.1 DAY & ZIMMERMANN KANSAS LLC	4
3.2 HAZARDOUS WASTE STORAGE UNITS	4
3.3 DATA QUALITY OBJECTIVES	5
4 CLOSURE STANDARDS	14
5 EXTENT OF CLOSURE.....	16
6 MAXIMUM INVENTORY OF HAZARDOUS WASTE	17
7 CLOSURE ACTIVITIES	18
7.1 FACILITY DECONTAMINATION	18
7.1.1 Sweeping.....	18
7.1.2 Inspecting.....	18
7.1.3 Washing	18
7.1.4 Sampling and Analysis	19
7.2 SOIL SAMPLING	19
7.3 SAMPLE HANDLING.....	20
7.4 SAMPLE AND DOCUMENT CUSTODY.....	20
7.4.1 Field Logbook.....	21
7.4.2 Sample Collection Field Sheets	21
7.4.3 Daily Quality Control Reports	21
7.4.4 Photographic Documentation	22
7.4.5 Chain of Custody	22
8 CLOSURE SCHEDULE	23
9 CLOSURE EXTENSION	24
9.1 CLOSURE NOTIFICATION	24
9.2 TIME ALLOWED FOR CLOSURE.....	24
9.3 CLOSURE EXTENSION.....	25
10 WASTE DISPOSAL AND REMOVAL	26

11	FINANCIAL ASSURANCE AND CLOSURE	27
11.1	CLOSURE REPORT	27
11.2	POST-CLOSURE ACTIVITIES	28
11.3	CLOSURE COST ESTIMATE	28
11.4	FINANCIAL ASSURANCE FOR CLOSURE	28
12	REFERENCES	29

APPENDICES

Appendix

A	LISTING OF CONSTITUENTS FOR TESTING, REMEDIATION GOALS AND PROJECT QUANTIFICATION LIMIT GOALS
B	QUALITY ASSURANCE PROJECT PLAN

TABLES

<u>Table</u>	<u>Page</u>
1	RCRA PERMITTED HAZARDOUS WASTE STORAGE FACILITIES 5
2	LISTING OF CONSTITUENTS FOR TESTING 6

FIGURES

Figure

1	SITE LOCATION MAP
2	LOCATION OF 1800 AREA RCRA HAZARDOUS WASTE STORAGE FACILITIES
3a	MAGAZINE CONSTRUCTION PLANS, ELEVATIONS AND SECTION PLANS
3b	MAGAZINE CONSTRUCTION PLANS, FOUNDATION AND FLOOR PLANS
3c	MAGAZINE CONSTRUCTION PLANS, FRAMING PLANS
4	LOCATION OF 1900 AREA RCRA HAZARDOUS WASTE STORAGE FACILITIES
5	IGLOO CONSTRUCTION PLANS, FLOOR AND ELEVATION PLANS
6	LOCATION OF 2700 AREA RCRA HAZARDOUS WASTE STORAGE FACILITIES
7	2700 AREA IGLOO CONSTRUCTION PLANS, FLOOR AND ELEVATION PLANS

ACRONYMS AND ABBREVIATIONS

BMS	Background Metals Study
CBU	Cluster bomb
CFR	<i>Code of Federal Regulations</i>
DQCR	Daily Quality Control Report
D&Z	Day & Zimmermann Kansas LLC
EPA	United States Environmental Protection Agency
KDHE	Kansas Department of Health and Environment
KSAAP	Kansas Army Ammunition Plant
lbs	Pounds
mg/kg	Milligrams per kilogram
mm	Millimeter
OD	Open detonation
PEP	Propellants, explosives, and pyrotechnics
PPE	Personal protective equipment
psi	Pounds per square inch
QA/QC	Quality assurance/quality control
RCRA	Resource Conservation and Recovery Act
RSK	Risk-Based Standards
RSL	Regional Screening Level
SCFS	Sample Collection Field Sheet
SW-846	EPA Publication, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods"
TSDf	Treatment, Storage, and Disposal Facility
UTL	Upper Tolerance Limit

SECTION 1

INTRODUCTION

Day & Zimmermann Kansas LLC (D&Z) has prepared this Closure Plan for the 12 Resource Conservation and Recovery Act (RCRA) permitted hazardous waste container storage units on site at the D&Z facility at the former Kansas Army Ammunition Plant (KSAAP) in Parsons, Kansas. The permitted storage units consist of 11 igloo structures within the 1900 and 2700 Areas, and one magazine structure within the 1800 Area.

Three separate areas within D&Z contain RCRA-regulated hazardous waste storage units (see Figure 1)—the 1800 area magazines, the 1900 area igloos, and the 2700 area igloos. D&Z is a large quantity hazardous waste generator that operates under a RCRA Hazardous Waste Permit.

1800 Area Magazine

The 1800 Area Magazines are in the southeastern portion of D&Z. Magazine 1816 is used for storage of solid hazardous wastes. See Figure 2 for the layout of the 1800 Magazine Area. As shown on Figures 3a, 3b, and 3c, the magazine is constructed of wood columns and tile pilasters with 8-inch-thick tiled walls on a 6-inch reinforced concrete floor slab poured over fill on grade. The walls are 14 feet high. The roof is a pitched roof, laid over a wood truss system spanning the width of the building (i.e., there are no interior columns). Roofing materials are asbestos shingles over tongue and groove wooden sheathing, laid on 2- by 8-inch wooden joists and stringers. Twelve metal ventilators are installed along the peak of the roof. The dimensions of the magazine are 216 feet by 50 feet, encompassing an approximate floor area of 10,800 square feet.

1900 Area Igloos

The 1900 Area Igloos are in the southeastern portion of D&Z. Within the 1900 Area, Igloos 1934, 1935, 1936, 1942, 1967, 1969, 1970, and 1979 are used for storage of solid and liquid hazardous wastes. See Figure 4 for the layout of the 1900 Area Igloos. As shown on Figure 5, each of these igloos is constructed of poured concrete with arched ceilings, approximately 13 feet high at the peak. The concrete walls vary in thickness from 8 to 16 inches, and rest on a concrete foundation. The 6-inch-thick floor slab is 60 feet 8 inches long by 25 feet 6 inches wide, encompassing an approximate floor area of 1,547 square feet. Each of the storage igloos is earth-covered to a minimum depth of 2 feet with 2:1 side slopes. The concrete floors in the igloos are pitched 0.5 inch from the center line to the troughs on the side of the igloos for drainage. The drainage troughs are 4 inches wide by 2 inches deep, and run the length of the igloo. Igloos 1936, 1942, 1967, 1969, 1970, and 1979 are utilized for storing containers with free liquids,

and thus are constructed with a secondary spill containment system. This included capping of all troughs in these igloos so no liquids can leave the igloo.

A ventilator is installed in an 18-inch-square concrete shaft at the rear of each storage igloo. In addition to the ventilator, two lightning arresters are at the front and rear of each igloo. Each lightning arrester is tied into the wire reinforcement rods of the concrete walls in each igloo.

2700 Area Igloos

The 2700 Area Igloos are in the east-central portion of D&Z. Solid hazardous wastes to be thermally treated at the open detonation (OD) grounds are stored in Igloos 2707, 2708, and 2709 within the 2700 Area prior to treatment. See Figure 6 for the layout of the 2700 Area Igloos. All three igloos are of identical construction (see Figure 7). These storage igloos are constructed of poured reinforced concrete. The reinforced concrete slab walls are 6 inches thick and rest on an 8-inch reinforced concrete slab floor poured on fill on grade. The floor dimensions of each igloo are 6 by 6 feet, for a total floor space of 36 square feet. Ceiling height within the igloos is 7 feet. Each igloo is earth-covered to a minimum depth of 2 feet with 1:1 grass-covered side slopes.

SECTION 2

PURPOSE

This document identifies all steps necessary to completely close the RCRA Permitted hazardous waste storage units, and details planned closure activities. This Closure Plan details how the RCRA Permitted hazardous waste storage units will be closed in accordance with the requirements of *Kansas Administrative Regulations* (KAR) 270.14(b)(13), 270.14(b)(15-18), 264.110-264.115, and 264.178.

The plan describes waste removal procedures, decontamination procedures, and the criteria for meeting the closure performance criteria.

SECTION 3 FACILITY DESCRIPTION

The following summarizes D&Z and the hazardous waste storage units.

3.1 DAY & ZIMMERMANN KANSAS LLC

D&Z is in southeast Kansas, approximately 3 miles east of the town of Parsons, and 2 miles south of U.S. Highway 400 in Labette County. The facility is a privately owned and operated company. The original facility now occupied by D&Z was constructed in 1941-1942, and was part of the former KSAAP. D&Z has operated the facility continuously from March 1, 1970 to the present.

The facility covers approximately 4,000 acres and includes 27.4 miles of roadway and 9.25 miles of railroad. D&Z has over 954,574 square feet of building and storage areas. The Union Pacific Railroad serves the facility. The surrounding land use is primarily agricultural.

In the past, the D&Z facility's operations included loading detonation bombs (100 pounds [lbs], 250 lbs, 750 lbs, and 1,000 lbs), cluster bombs (CBU), and artillery ammunition (105 millimeter [mm], 75 mm, and 4.2-inch shells), and 81 mm mortars. The D&Z facility manufactured various components, including fuzes, primers, detonators, relays, boosters, and supplementary charges; and reworked fired 105 mm cartridge cases (brass).

Currently, two manufacturing areas and three storage areas are at the D&Z facility. Current operations include loading, assembling, and packing munitions items. The facility does not currently manufacture propellants, explosives, or pyrotechnic (PEP) components, but does assemble them in munition items.

D&Z has RCRA hazardous waste container storage areas that store wastes for more than 90 days. In addition, the facility provides thermal treatment through OD on site for reactive hazardous wastes; these units are also regulated under RCRA.

3.2 HAZARDOUS WASTE STORAGE UNITS

Hazardous wastes generated at the facility are stored in 12 permitted container storage units on site prior to thermal treatment on site, or disposal off site at an appropriate permitted Treatment, Storage, and Disposal Facility (TSDF). The permitted storage units consist of 11 igloo structures within the 1900 and 2700 Areas, and one magazine structure within the 1800 Area.

Three separate areas within D&Z contain RCRA-regulated hazardous waste storage units (see Figure 1)—the 1800 area magazines, the 1900 area igloos, and the 2700 area igloos.

The 1800 Area Magazines are in the southeastern portion of D&Z (see Figure 1). Magazine 1816 is used for storage of solid hazardous wastes. See Figure 2 for the layout of the 1800 Magazine Area.

The 1900 Area Igloos are in the southeastern portion of D&Z (see Figure 1). Igloos 1934, 1935, 1936, 1942, 1967, 1969, 1970, and 1979 are used for storage of solid and liquid hazardous wastes. See Figure 6 for the layout of the 1900 Area Igloos.

The 2700 Area Igloos are in the east-central portion of D&Z (see Figure 1). Igloos 2707, 2708, and 2709 are used for storage of hazardous wastes. See Figure 9 for the layout of the 2700 Area Igloos.

Table 1 lists all RCRA hazardous waste storage units at D&Z. All of these hazardous waste storage units are currently used; therefore, none of these has been swept clean.

TABLE 1
RCRA PERMITTED HAZARDOUS WASTE STORAGE FACILITIES

Location	Facility Type	Facility Size (Square Feet)	Capacity of Containers to be Stored (Gallons)	Materials
1816	Storage Magazine	10,800	118,800	various solid wastes
1934	Storage Igloo	1,547	17,600	various solid wastes
1935	Storage Igloo	1,547	17,600	various solid wastes
1936	Storage Igloo	1,547	17,600	various solid and liquid wastes
1942	Storage Igloo	1,547	17,600	various solid and liquid wastes
1967	Storage Igloo	1,547	17,600	various solid and liquid wastes
1969	Storage Igloo	1,547	17,600	various solid and liquid wastes
1970	Storage Igloo	1,547	17,600	various solid and liquid wastes
1979	Storage Igloo	1,547	17,600	various solid and liquid wastes
2707	Storage Igloo	36	440	items for thermal treatment
2708	Storage Igloo	36	440	items for thermal treatment
2709	Storage Igloo	36	400	items for thermal treatment

3.3 DATA QUALITY OBJECTIVES

The purpose of this Closure Plan is to detail closure activities planned for the RCRA hazardous waste storage units at D&Z. Federal regulations include both closure standards and specific actions to achieve proper site closure. This Closure Plan is designed to conform to the closure standards specified in KAR 28-31- 264 and 270.14(b)(13) and 270.14(b)(15-18). All wastes will be removed from each hazardous

waste storage unit, and all releases will be remediated so that clean closure will be achieved and post-closure care will not be required.

Closure will include acquisition and assessment of site-specific data to assess the presence of contamination. Wash water samples will be collected from the third rinse and submitted to an off-site laboratory for analysis for all wastes possibly stored in the hazardous waste management units. Results from these samples will be used to demonstrate that decontamination efforts have been completed successfully.

There are two sets of analyte lists that will be used to support the closure activities and these are presented in Table 2. The first list is those chemicals that are associated with the hazardous wastes that were stored at the facilities and this list includes metals, volatile organics, and explosives. The second analyte list is of the hazardous constituents identified in Appendix VIII of KAR 28-31- Part 261. The project quantification limit goals for these constituents in the various media (soils and rinse water) are presented in Appendix A, Tables A-1 through A-22.

TABLE 2
LISTING OF CONSTITUENTS FOR TESTING

Constituent	Chemical Abstracts Service (CAS) #	Analyte List for Managed Hazardous Waste	Analyte List for Hazardous Constituents¹
1, 1, 2 Trichloro - 1, 2, 2 trifluoromethane	76-13-1	x	x
1, 3, 5-Triamino-2, 4,6-trinitrobenzene (TATB)	3058-38-6	x	x
1,1,1,2-Tetrachloroethane	630-20-6		x
1,1,1-Trichloroethane	71-55-6	x	x
1,1,2,2-Tetrachloroethane	79-34-5		x
1,1,2-Trichloroethane	79-00-5	x	x
1,1-Dichloroethane	75-34-3		x
1,1-Dichloroethene	75-35-4		x
1,2,3-Trichloropropane	96-18-4		x
1,2,4,5-Tetrachlorobenzene	95-94-3		x
1,2,4-Trichlorobenzene	120-82-1		x
1,2-Dibromo-3-chloropropane	96-12-8		x
1,2-Dibromoethane (EDB)	106-93-4		x
1,2-Dichlorobenzene	95-50-1	x	x
1,2-Dichloroethane	107-06-2		x
1,2-Dichloropropane	78-87-5		x
1,3,5-Trinitrobenzene	99-35-4	x	x
1,3-Dichlorobenzene	541-73-1	x	x

TABLE 2

LISTING OF CONSTITUENTS FOR TESTING

Constituent	Chemical Abstracts Service (CAS) #	Analyte List for Managed Hazardous Waste	Analyte List for Hazardous Constituents ¹
1,3-Dinitrobenzene	99-65-0		x
1,4-Dichlorobenzene	106-46-7	x	x
1,4-Dioxane	123-91-1		x
1,4-Naphthoquinone	130-15-4		x
1-Naphthylamine	134-32-7		x
2,3,4,6-Tetrachlorophenol	58-90-2		x
2,3,7,8-TCDD (Tetrachloro-dibenzo- <i>p</i> -dioxin)	1746-01-6		x
2,4,5-T (2,4,5-Trichloro-phenoxyacetic acid)	93-76-5		x
2,4,5-Trichlorophenol	95-95-4		x
2,4,6-Trichlorophenol	88-06-2		x
2,4,6-Trinitrotoluene	118-96-7	x	x
2,4-D (2,4-Dichloro-phenoxyacetic acid)	94-75-7		x
2,4-Dichlorophenol	120-83-2		x
2,4-Dimethylphenol	105-67-9		x
2,4-Dinitrophenol	51-28-5		x
2,4-Dinitrotoluene	121-14-2	x	x
2,6-Dichlorophenol	87-65-0		x
2,6-Dinitrotoluene	606-20-2	x	x
2-Acetylaminofluorene	53-96-3		x
2-Amino-4,6-dinitrotoluene	35572-78-2	x	x
2-Chloronaphthalene	91-58-7		x
2-Chlorophenol	95-57-8		x
2-Ethoxyethanol	110-80-5	x	x
2-Hexanone	591-78-6		x
2-Methylnaphthalene	91-57-6		x
2-Naphthylamine	91-59-8		x
2-Nitroaniline	88-74-4		x
2-Nitrophenol	88-75-5		x
2-Nitropropane	79-46-9	x	x
2-Nitrotoluene	88-72-2	x	x
2-Picoline	109-06-8		x
3,3'-Dichlorobenzidine	91-94-1		x
3,3'-Dimethylbenzidine	119-93-7		x
3-Methylcholanthrene	56-49-5		x
3-Nitroaniline	99-09-2		x
3-Nitrotoluene	99-08-1	x	x
4,4-DDD (Dichlorodiphenyl-dichloroethane)	72-54-8		x

TABLE 2
LISTING OF CONSTITUENTS FOR TESTING

Constituent	Chemical Abstracts Service (CAS) #	Analyte List for Managed Hazardous Waste	Analyte List for Hazardous Constituents¹
4,4-DDT (Dichlorodiphenyl-trichloroethane)	50-29-3		x
4,4-DDE (Dichlorodiphenyl-dichloroethene)	72-55-9		x
4,6-Dinitro-o-cresol	534-52-1		x
4-Amino-2,6-dinitrotoluene	19406-51-0	x	x
4-Aminobiphenyl	92-67-1		x
4-Bromophenyl phenyl ether	101-55-3		x
4-Chlorophenyl phenyl ether	7005-72-3		x
4-Methyl-2-pentanone	108-10-1		x
4-Nitroaniline	100-01-6		x
4-Nitrophenol	100-02-7		x
4-Nitroquinoline-1-oxide	56-57-5		x
4-Nitrotoluene	99-99-1	x	x
5-Nitro-o-toluidine	99-55-8		x
7,12-Dimethylbenz(a)anthracene	57-97-6		x
a,a-Dimethylphenethylamine	122-09-8		x
Acenaphthene	83-32-9		x
Acenaphthylene	208-96-8		x
Acetone	67-64-1	x	x
Acetonitrile	75-05-8		x
Acetophenone	98-86-2		x
Acrolein	107-02-8		x
Acrylonitrile	107-13-1		x
Aldrin	309-00-2		x
Allyl chloride	107-05-1		x
alpha-BHC (Benzene hexachloride)	319-86-4		x
Aluminum	7429-90-5	x	x
Aniline	62-53-3		x
Anthracene	120-12-7		x
Antimony total	7440-36-0	x	x
Aramite	140-57-8		x
Arsenic total	7440-38-2	x	x
Barium total	7440-39-3	x	x
Benzene	71-43-2	x	x
Benzo(a)anthracene	56-55-3		x
Benzo(a)pyrene	50-32-8		x
Benzo(b)fluoranthene	205-99-2		x
Benzo(ghi)perylene	191-24-2		x
Benzo(k)fluoranthene	207-08-9		x

TABLE 2

LISTING OF CONSTITUENTS FOR TESTING

Constituent	Chemical Abstracts Service (CAS) #	Analyte List for Managed Hazardous Waste	Analyte List for Hazardous Constituents ¹
Benzyl alcohol	100-51-6		X
Beryllium total	7440-41-7		X
beta-BHC	319-85-7		X
Bis(2-chloro-1-methylethyl)ether	108-60-1		X
Bis(2-chloroethoxy)methane	111-91-1		X
Bis(2-chloroethyl)ether	111-44-4		X
Bis(2-ethylhexyl)phthalate	117-81-7		X
Bromodichloromethane	75-27-4		X
Bromoform	108-86-1		X
Butyl benzyl phthalate	85-68-7		X
Cadmium total	7440-43-9	X	X
Carbon disulfide	86-74-8	X	X
Carbon tetrachloride	75-15-0	X	X
Chlordane	57-74-9	X	X
Chlorobenzene	108-90-7	X	X
Chlorobenzilate	510-15-6		X
Chloroethane	75-00-3		X
Chloroform	67-66-3		X
Chloroprene	126-99-8		X
Chromium total	7440-47-3	X	X
Chrysene	218-01-9		X
cis -1,3-Dichloropropene	10061-01-5		X
Cobalt total	7440-48-4		X
Copper total	7440-50-8	X	X
Cyanide	57-12-5		X
Cyclohexane	110-82-7	X	X
delta-BHC	319-86-8		X
Diallate	2303-16-4		X
Dibenz(a,h)anthracene	53-70-3		X
Dibenzofuran	132-64-9		X
Dibromochloromethane	124-48-1		X
Dichlorodifluoromethane	75-71-8		X
Dieldrin	60-57-1		X
Diethylphthalate	60-51-5		X
Dimethoate	131-11-3		X
Dimethylphthalate	84-74-2		X
Di-n-butylphthalate	117-84-0		X
Di-n-octylphthalate	88-85-7		X
Dinoseb	122-39-4		X
Diphenylamine	298-04-4		X
Disulfaton	298-04-4		X

TABLE 2

LISTING OF CONSTITUENTS FOR TESTING

Constituent	Chemical Abstracts Service (CAS) #	Analyte List for Managed Hazardous Waste	Analyte List for Hazardous Constituents ¹
Endosulfon I	115-29-7		X
Endosulfon II	333213-65-9		X
Endosulfon sulfate	1031-07-8		X
Endrin	72-20-8		X
Endrin aldehyde	7421-93-4		X
Ethyl acetate	141-78-6	X	X
Ethyl ether	60-29-7	X	X
Ethyl methanesulfonate	62-50-0		X
Ethylbenzene	100-41-4	X	X
Ethylmethacrylate	97-63-2		X
Famphur	52-85-7		X
Fluoranthene	206-44-0		X
Fluorene	86-73-7		X
gamma-BHC	58-89-9		X
Hafnium	7440-58-6		X
Heptachlor	76-44-8		X
Heptachlor epoxide	1024-57-3		X
Hexachlorobenzene	118-74-1		X
Hexachlorobutadiene	87-68-3		X
Hexachlorocyclopentadiene	77-47-4		X
Hexachloroethane	67-72-1		X
Hexachlorophene	70-30-4	X	X
Hexachloropropene	1888-71-7		X
Hexnitrostilbene (HNS)	20062-22-0	X	X
HMX (Cyclotetramethylene-tetranitramine)	2691-41-0	X	X
Indeno(1,2,3-cd)pyrene	193-39-5		X
Isobutyl alcohol	78-83-1	X	X
Isodrin	465-73-6		X
Isophorone	78-59-1		X
Isosafrole	120-58-1		X
Kepone	143-50-0		X
Lead total	7439-92-1	X	X
Lithium	7439-93-2	X	X
M-Cresol	108-39-4		X
Mercury total	7439-97-6	X	X
Methacrylonitrile	126-98-7		X
Methanol	67-56-1	X	X
Methapyrilene	91-80-5		X
Methoxychlor	72-43-5		X
Methyl bromide	74-83-9		X

TABLE 2
LISTING OF CONSTITUENTS FOR TESTING

Constituent	Chemical Abstracts Service (CAS) #	Analyte List for Managed Hazardous Waste	Analyte List for Hazardous Constituents¹
Methyl chloride	74-87-3		X
Methyl ethyl ketone	78-93-3	X	X
Methyl iodide	74-88-4		X
Methyl iso butyl ketone	108-10-1	X	X
Methyl methacrylate	80-62-6		X
Methyl methanesulfonate	66-27-3		X
Methyl parathion	56-38-2		X
Methylene bromide	74-95-3		X
Methylene chloride	75-09-2	X	X
Naphthalene	91-20-3		X
N-butyl Alcohol	71-36-3	X	X
Nickel total	7440-02-0		X
Nitrate	84145-82-4		X
Nitrobenzene	98-95-3		X
Nitrocellulose	9004-70-0	X	X
Nitroglycerine	55-63-0	X	X
Nitroguanadine	556-88-7	X	X
N-Nitrosodiethylamine	55-18-5		X
N-Nitrosodimethylamine	62-75-9		X
N-Nitrosodi-n-butylamine	924-16-3		X
N-Nitrosodi-n-propylamine	621-64-7		X
N-Nitrosodiphenylamine	86-30-6		X
N-Nitrosomethylethylamine	10595-95-6		X
N-Nitrosomorpholine	59-89-2		X
N-Nitrosopiperidine	100-75-4		X
N-Nitrosopyrrolidine	930-55-2		X
O,O,O-Triethylphosphorothiolate	126-68-1		X
O,O-Diethyl O-2-pyrazinyl phosphorothioate	297-97-2		X
o-Cresol	95-48-7		X
o-Toluidine	95-53-4		X
p -(Dimethylamino)azobenzene	60-11-7		X
Parathion	56-38-2		X
PCBs (Polychlorinated biphenyls)	1336-36-3		X
p-Chloroaniline	106-47-8		X
p-Chloro-m-cresol	59-50-7		X
p-Cresol	106-44-5		X
Pentachlorobenzene	608-93-5		X
Pentachloroethane	76-01-7		X

TABLE 2
LISTING OF CONSTITUENTS FOR TESTING

Constituent	Chemical Abstracts Service (CAS) #	Analyte List for Managed Hazardous Waste	Analyte List for Hazardous Constituents¹
Pentachloronitrobenzene	82-68-8		X
Pentachlorophenol	87-86-5		X
Perchlorate	7790-98-9		X
PETN (Pentaerythrite Tetranitrate)	9032-10-4	X	X
Phenacetin	62-44-2		X
Phenanthrene	85-01-8		X
Phenol	108-95-2		X
Phorate	298-02-2		X
Potassium	9/7/7440		X
p-Phenylenediamine	106-50-3		X
Pronamide	23950-58-5		X
Propionitrile	107-12-0		X
Pyrene	129-00-0		X
Pyridine	110-86-1	X	X
RDX (1,3,5-Trinitroperhydro-1,3,5-triazine)	121-82-4	X	X
Safrole	94-59-7		X
Selenium total	7782-49-2	X	X
Silver total	7440-22-4	X	X
Silvex	93-72-1		X
Styrene	100-42-5	X	X
Sulfate	18785-72-3		X
Sulfide	8496-25-8		X
Tetrachloroethene	127-18-4	X	X
Tetraethyl dithiopyrophosphate	3689-24-5		X
Tetryl	479-45-8	X	X
Thallium total	7440-28-0		X
Tin total	7440-31-5	X	X
Toluene	108-88-3	X	X
Toxaphene	8001-35-2		X
<i>trans</i> -1,2-Dichloroethene	156-60-5		X
<i>trans</i> -1,3-Dichloropropene	10061-02-6		X
<i>trans</i> -1,4-dichloro-2-butene	110-57-6		X
Trichloroethene	86-42-0	X	X
Trichlorofluoromethane	75-69-4	X	X
Trinitrobenzene	99-35-4		X
Vanadium total	7440-62-2		X
Vinyl acetate	108-05-4		X
Vinyl chloride	75-01-4		X
Xylene (total)	108-38-3	X	X

TABLE 2

LISTING OF CONSTITUENTS FOR TESTING

Constituent	Chemical Abstracts Service (CAS) #	Analyte List for Managed Hazardous Waste	Analyte List for Hazardous Constituents¹
Zinc total	7440-66-6		x
Zirconium	7440-67-7		x

Notes:

¹This list is consistent with 40CFR 261 Appendix VIII

SECTION 4

CLOSURE STANDARDS

Federal regulations include both closure standards and specific actions to achieve proper site closure. This Closure Plan is designed to conform to the closure standards specified in KAR 28-31- 264.

This closure plan is designed to ensure that the hazardous waste storage units will not require further maintenance and controls; minimize and eliminate threats to human health and the environment; and prevent escape of hazardous wastes, hazardous waste constituents, or waste decomposition products to the ground or surface waters or to the atmosphere. Typically, closure activities would include drum and container removal, surface sweeping, surface cleaning, and confirmation sampling. The drums and containers will be removed from the RCRA hazardous waste storage units for disposal. Each RCRA hazardous waste storage unit will also be surface swept to remove residual materials left at the facility. Further activities at the RCRA hazardous waste storage units will include triple pressure (3500 pounds per square inch [psi] minimum) rinsing of floors and walls with water. A sample will be collected from the rinse water generated during the third rinse of each RCRA hazardous waste storage unit and analyzed for all constituents possibly stored at the facility to determine if decontamination efforts have been successful. The rinse water will be containerized and composite samples will be collected to determine if the rinse water is hazardous or nonhazardous prior to proper off-site disposal.

For each of the 1,813-square foot igloos, 6 to 12 soil samples will be collected from below the floor slab; the exact number of soil samples per igloos will depend on the degree of cracking in the floor. For the Storage Magazine 1813, a total of 10 to 30 soil samples will be collected beneath the floor slab in areas that have been used for management of hazardous waste, depending on the level of cracking in the floor. This includes one sample to be collected at each corner approximately 2 to 3 feet from the walls to avoid any footings. The locations of all soil samples will be proposed by D&Z and confirmed by the Kansas Department of Health and Environment (KDHE). These soil samples will be collected directly beneath the concrete floor slab and sub-grade fill materials and at other areas with potential for contamination (loading dock, drains, etc.)—at up to 12 discrete locations in each igloo and 12 to 40 discrete locations in storage magazine 1816. These samples will be analyzed for all wastes stored in the hazardous waste management units which are identified in Table 2 third column. In addition, one to two soil samples from each igloo and 5 to 10 soil samples from storage magazine 1816 will be collected at other areas with potential for contamination (loading dock, drains, etc.). These soil samples will be analyzed for the hazardous constituents identified KAR 28-31- 261 Appendix VIII as identified in Table 2, last column. The locations of all soil samples will be proposed by D&Z and approved by KDHE. KDHE can ask for

soil samples at any locations and depths where contamination is reasonably expected to be present. The soil sample results will be compared to the most recent KDHE Tier 2 Risk-Based Standards for Kansas (RSK) screening levels for a non-residential scenario, presented in Appendix A Tables A-1 through A-11. If no RSK screening levels have been established, the soil sample results will be compared to the most recent version of the U.S. Environmental Protection Agency (EPA) industrial soil Regional Screening Levels (RSL) using the same unit risk factors KDHE used to develop the RSK levels (cancer risks of $1\text{E}-05$ and hazard index of 1).

A background metals study (BMS) was completed in 1994 to determine metals concentrations in surface and subsurface soil at KSAAP (Radian Corporation 1994). The 95 percent Upper Tolerance Limit (UTL) for arsenic was statistically derived as part of the BMS and is considered the upper limit of background at KSAAP and D&Z. The background UTLs for arsenic at KSAAP are 16.87 milligrams per kilogram (mg/kg) (in surface soil) and 37.9 mg/kg (in subsurface soil).

Concentrations of analytes in rinsewater generated during the closure activities will be compared to the most recent KDHE Tier 2 RSK groundwater screening levels for a non-residential scenario, presented in Appendix A, Tables A-12 through A-22. If no RSK screening levels have been established, the water sample results will be compared to most recent version of EPA tapwater RSLs using the same unit risk factors KDHE used to develop the RSK levels (cancer risks of $1\text{E}-05$ and hazard index of 1).

SECTION 5

EXTENT OF CLOSURE

D&Z intends to complete clean closure of 12 RCRA Permitted hazardous waste storage units to non-residential standards.

SECTION 6

MAXIMUM INVENTORY OF HAZARDOUS WASTE

D&Z managed hazardous waste in accordance with its RCRA permit. RCRA Permitted hazardous waste storage units are within the 1800, 1900, and 2700 Areas. D&Z is classified as a large quantity generator of hazardous waste generating more than 2,200 pounds of hazardous waste per month. Maximum storage capacities are as follows: 118,800 gallons at the 1816 hazardous waste management unit, 17,600 gallons at the 1900 hazardous waste management units, and 440 gallons at each of the 2707, 2708, and 2709 hazardous waste management units.

SECTION 7 CLOSURE ACTIVITIES

Once D&Z begins closure activities for the RCRA Permitted hazardous waste storage units, no additional hazardous waste will be accepted for storage in the units. All hazardous waste and materials in inventory will be removed to a State and/or EPA permitted TSDF or recycling site. Once all the hazardous waste and materials are removed, the hazardous waste storage units will be inspected for loose items (i.e., papers, pallets, or empty containers) and cracks or signs of deterioration in the floor.

7.1 FACILITY DECONTAMINATION

7.1.1 Sweeping

Trained personnel will remove and clean all visible signs of contamination. The walls and floors have or will be swept to remove dry residual materials. The residual material was or will be placed in 55-gallon drum(s) for chemical analysis and proper disposal.

7.1.2 Inspecting

A pre-survey inspection will be completed on each of the hazardous waste storage units. During the pre-survey, all cracks in the floors will be evaluated. If cracks are found, they will be sealed and an explosive hazard survey will then be conducted. An EXPRAY colorimetric test kit will be used to determine if explosives are present for all units. If the test indicates a possible explosive hazard, further testing will be conducted (e.g., flame testing) to determine the actual hazard level. Based on the results, proper notification will be initiated in accordance with the D&Z Site Safety Program. If the test indicates no explosive hazard exists, closure activities will continue. The floors will also be inspected for evidence of spills and releases during the pre-survey.

7.1.3 Washing

Trained personnel wearing appropriate personal protective equipment (PPE) will remove and clean up all visible signs of contamination. A series of three washes will be used to wash the walls and floors of each hazardous waste storage unit. All wash water will be transferred and collected in a portable tank.

7.1.4 Sampling and Analysis

All sampling and analysis methods will accord with EPA Publication SW-846, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," 3rd Edition. A sample will be collected from the rinse water generated during the third rinse of each RCRA hazardous waste storage unit. The sample will be filter through a 0.45 micron filter, and analyzed for all constituents possibly stored at the facility to determine if decontamination efforts have been successful. One composite sample will be collected from the wash water of each hazardous waste storage unit and analyzed for all wastes stored in the hazardous waste management units (see Table 2, Column 3) to determine appropriate disposal methods. The wash water will be considered hazardous if: the concentration of any analyte exceeds the corresponding concentration in KAR 28-31- 261.24, Table 1 – Maximum Concentration of Contaminants for the Toxicity Characteristic.

If the analyses indicate that the wash water is hazardous or above the concentrations identified in KAR 28-31- 261.24, Table 1, it will be manifested and properly disposed of. If the analysis shows that the requirements in Table 1 in KAR 28-31- 261.24 are met, the wash water will be discharged to the sanitary sewer system or placed into the D&Z wastewater treatment system. If placed in the sanitary sewer system, D&Z will obtain approval from Great Plains Development Authority, or if placed in D&Z's wastewater treatment system, approval from KDHE will be obtained prior to treatment.

7.2 SOIL SAMPLING

A concrete coring drill will be used to drill through the floor, and a hand auger will be utilized to sample soil below the concrete floor. Following soil sampling, all concrete core holes will be repaired with concrete grout. Soil samples will be collected from below the floor slab and other areas that may be contaminated (loading dock, drains, etc.) at 6 to 12 discrete locations in each igloo and 18 to 30 discrete locations in storage magazine 1816. These samples will be analyzed for all wastes possibly stored in the hazardous waste management units (see Table 2). In addition, one to two soil samples from each igloo and 5 to 12 soil samples from storage magazine 1816 will be collected at other areas expected to be contaminated (loading dock, drains, etc.). These soil samples will be analyzed for all wastes possibly stored in the hazardous waste management units (see Table 2, Column 3). Locations of all soil samples proposed by D&Z will be approved by KDHE. KDHE can ask for soil samples at any locations and depths reasonably expected to have received releases of hazardous waste.

Sampling and Analysis

All sampling and analysis methods will accord with EPA Publication SW-846, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," 3rd Edition. One discrete soil sample will be collected at each sample location from 0 to 2 feet below the bottom of the concrete. All samples will be analyzed for all wastes possibly stored in the hazardous waste management units. The soil sample results will be compared to the non-residential soil action levels presented in the most recent version of the KDHE RSK Manual. If no RSK screening levels have been established, the soil sample results will be compared to most recent version of the EPA industrial soil RSLs using the same unit risk factors KDHE used to develop the RSK levels (cancer risk of $1E-05$ and hazard index of 1). Samples collected for chemical testing will be immediately placed in the appropriate container, labeled, packaged in a cooler with ice, and shipped to the designated laboratory under a chain of custody (see Attachment A – D&Z site-wide QAPP).

If soil concentrations exceed the closure standards, soil removal will be required and D&Z will remove a portion of the concrete flooring and excavate a predetermined quantity of contaminated soil from beneath the floor slab. Soil disposal options will be determined based on the contaminants of concern and the respective concentrations. Upon completion of the excavation, D&Z will collect confirmation samples from the excavated area and transport them to an off-site laboratory for analysis for the contaminants of concern. If results indicate the area meets the closure standards specified in Section 4, the excavated area will be properly backfilled with the tested clean soil that will be properly compacted. The concrete flooring will be replaced.

7.3 SAMPLE HANDLING

Samples collected for chemical testing will be immediately placed in the appropriate container, labeled, packaged in a cooler with ice, and shipped to the designated laboratory under a chain of custody (see Attachment B – Site-wide QAAP).

7.4 SAMPLE AND DOCUMENT CUSTODY

Verifiable sample custody is an integral part of all field and laboratory operations associated with closing the hazardous waste storage units. Traceable steps will be taken in the field and in the laboratory to document and ensure that all samples have been properly acquired, preserved, and identified, and that sample integrity has not been jeopardized. The following sections provide detail related to completing verifiable field and laboratory documentation.

7.4.1 Field Logbook

Bound field logbooks will be used to record pertinent information during the field activities. Documentation in the field logbook will be sufficient to reconstruct the sampling situation without relying on the memories of the field team members.

Field sketches will be made in the field logbook when appropriate, including (but not limited to), sampling location sketches including reference points tied to existing permanent structures in the area (trees, fences, buildings, etc.).

All entries will be made in blue or black indelible ink and no erasures are allowed. If an incorrect entry is made, the information will be crossed out with a single strike mark and the change initialed and dated by the team member making the logbook change. Each page in the field logbook will be signed and dated at the bottom of the page by any team member making entries on the page.

The field logbooks will be identified on the cover by the project name, project number, and the logbook number. The logbooks will be stored in the field project files when not in use. At completion of the field activities, the original field logbooks will be submitted to the Project Coordinator/Manager to be retained in the project file.

7.4.2 Sample Collection Field Sheets

To supplement the information recorded in the field logbook, sample collection field sheets (SCFS) will also be completed for each sampling location. The SCFS will be cross-checked by the field team leader or project manager for completeness and accuracy at the end of each day. The SCFS will be signed and dated by the sampler making entries on the SCFS.

7.4.3 Daily Quality Control Reports

To further supplement the information recorded in the logbook, daily quality control reports (DQCR) will be completed for each day's work. The DQCRs will be completed by each sampling team leader and cross-checked at the end of the day by the field manager for accuracy and completeness. The DQCRs will be signed and dated by each field team member making entries. The DQCRs will be forwarded to the Project Coordinator for review.

7.4.4 Photographic Documentation

Digital photographs may be taken of various field activities as necessary by the field manager. Details of the photograph including date, time, location, field activity, and description of landmarks in the photograph, and the name of the photographer, will be recorded in the field logbook. If a file name is associated with the photograph, the file name will also be recorded. All photographs will be downloaded from the digital camera and placed in the project files.

7.4.5 Chain of Custody

The purpose of the chain-of-custody procedure is to prevent mis-identification of samples, prevent tampering of the samples during shipment and storage, allow easy identification of tampering, and allow for easy tracking of possession. If the chain-of-custody is broken at any time from sample collection through sample analysis, the Quality Control Coordinator will be notified. The Quality Control Coordinator is responsible for implementing corrective action and responsible for ensuring that all necessary documentation is completed.

Three-sheet carbon Chain-of-Custody forms will be used. The original (white) sheet and one copy (yellow) sheet will accompany the samples to the laboratory. The original (white) will ultimately be included in the hard copy sample results. The laboratory will keep the copy (yellow) sheet on file for a minimum of 1 year. The second copy (pink) sheet will be kept by the sampling team and will be included in the field activities documentation file.

The laboratory will compare the samples entered on the Chain-of-Custody forms with the sample containers received by the laboratory. If the laboratory finds any discrepancies, the laboratory will contact the Project Manager for resolution. The Chain-of Custody forms will be the primary source of information for the laboratory to enter data into the laboratory's sample tracking system.

SECTION 8

CLOSURE SCHEDULE

Closure activities will be initiated no later than 30 days after receipt of the final volume of hazardous wastes. All hazardous waste maintained in the hazardous waste storage units will be removed and properly disposed of within 90 days after receiving the final volume of hazardous waste. Closure activities must be complete within 180 days after removing the final volume of hazardous waste. A detailed schedule, based on calendar days, for the on-site closure activities is as follows:

<u>Description</u>	<u>Dates</u>
Notify KDHE Bureau of Waste Management	Day 1
Receipt of final volume of hazardous waste	Day 30
Begin closure period	Day 60
Removal/disposal of final waste inventory	Day 60
Decontamination of Hazardous Waste Storage Facilities (Start Date)	
Igloos 1934, 1935, 1936, and 1942	Day 61
Igloos 1967, 1969, 1970, and 1979	Day 91
Magazine 1816	Day 100
Decontamination verification	
Igloos 1934, 1935, 1936, and 1942	Day 110
Igloos 1967, 1969, 1970, and 1979	Day 115
Magazine 1816	Day 120
Submittal of final report and certification	Day 180
Completion of closure period	Day 210

SECTION 9

CLOSURE EXTENSION

D&Z intends to close the hazardous waste storage units at D&Z as specified in this Closure Plan. However, the Closure Plan will be amended whenever any pertinent changes are made to existing equipment, structures, instruments, or procedures related to the management or closure activities of the facility.

A written request for a permit modification, including a copy of the amended Closure Plan, will be submitted for approval to the KDHE Bureau of Waste Management at least 60 days prior to the proposed change in facility design or operation, and no later than 60 days after an unexpected event has occurred which has affected the Closure Plan. If an unexpected event occurs during the closure period, a permit modification will be requested no later than 30 days after the unexpected event.

9.1 CLOSURE NOTIFICATION

D&Z will notify the KDHE Bureau of Waste Management in writing at least 45 days prior to the date the hazardous waste storage unit is expected to close. If in the event that not all soil contamination can be removed or clean-up standard(s) cannot be met, then D&Z within 60 days of the discovery will submit for regulatory approval an amended closure plan to include post-closure care.

9.2 TIME ALLOWED FOR CLOSURE

A schedule showing the number of calendar days allowed for the closure process is presented in Section 8. At this time, D&Z expects to complete closure within 180 days. If however, an extension would be necessary to properly close the hazardous waste storage units, a petition will be sent to the KDHE Bureau of Waste Management at least 30 days prior to the affected closure period. The petition would demonstrate that all steps to prevent threats to human health and the environment, including compliance with all applicable permit requirements, have and will be taken while the site is inactive but not yet closed.

9.3 CLOSURE EXTENSION

No extension for closure time is anticipated. If, however, an extension would be necessary to properly close the hazardous waste storage units, a petition will be sent to the KDHE Bureau of Waste Management amending the closure schedule shown in Section 8. This petition will demonstrate one or more of the following:

- Need for more than 90 days to remove wastes received at the facility prior to commencement of the closure activities
- Need for more than 180 days to close the facility
- A reasonable likelihood that a person other than the owner/operator will recommence operation of the site
- Incompatibility of closure with continued operation
- That all steps have and will be taken to prevent threats to human health and the environment from the unclosed but inactive facility.

SECTION 10

WASTE DISPOSAL AND REMOVAL

The hazardous waste and hazardous waste residues will be removed and disposed as described in Section 7 during the closure period (KAR 28-31- 264.114). No additional hazardous materials/hazardous wastes will be accepted at the hazardous waste storage units.

All hazardous waste and materials remaining in inventory will be removed in accordance with a contractual agreement with a Kansas and/or EPA permitted TSDF or recycling facility. After the final inventory of hazardous waste has been removed, each hazardous waste storage unit will be inspected for loose items (i.e., papers, pallets, or empty containers). Any items found will be removed and properly disposed of.

SECTION 11

FINANCIAL ASSURANCE AND CLOSURE

Once the sampling and decontamination processes at each hazardous waste storage unit have been completed, a registered Professional Engineer will visually inspect the facility, review all analytical results, and if all closure criteria are met, certify the facility closure.

Within 60 days of completion of closure of the hazardous waste storage unit, certification that the hazardous waste storage unit has been closed in accordance with the specifications in the Closure Plan must be submitted to KDHE Bureau of Waste Management. D&Z and the independent, registered professional engineer must sign the certification.

11.1 CLOSURE REPORT

D&Z will prepare a report for the KDHE Bureau of Waste Management that summarizes the closure activities. The report will include a brief narrative of the field activities and analytical results, investigation-derived waste disposal summary, recommendations and conclusions, and copies of sample collection field sheets, chain-of-custody forms, laboratory report, and manifests (if applicable).

D&Z will submit a certified closure report within 60 days of completing closure activities. The report will be completed by a certification statement that meets the requirements of KAR 28-31- 270.11. The report will be reviewed and certified by a qualified and independent Professional Engineer registered in Kansas. The independent registered Professional Engineer or his/her representative will be present during closure activities. The independent registered professional engineer must mention in his or her closure certification report that he/she was present during closure activities. The closure plan should include a statement acknowledging this requirement. The closure report will contain discussion of the items listed below:

- Description of the hazardous waste storage units being closed.
- A diagram or blueprint drawing of the unit(s) showing dimensions, construction details, appurtenant structures such as curbs, sumps, floor drains, and the relationship of the hazardous waste storage areas to other points or structures on the facility property. The scales and the north arrows should be indicated.
- Description of closure field tasks performed.
- Chronological field log of closure activities.
- Summary of the closure sampling protocol.

- Description of analytical data.
- Project contacts.
- Bill of lading, manifest, or certificate of destruction.
- Sample documentation (copies of logbooks, chain-of-custody records, shipping records).
- Laboratory analytical testing results.
- Copy of KDHE approved Closure Plan.
- The volume of waste and waste residue removed, including the waste (residue) resulting from decontamination activities.
- A brief description of the current regulatory status and operations at the facility.

The certification will be signed by the owner or operator and by an independent registered Professional Engineer who will certify that the hazardous waste storage areas have been closed in accordance with the approved Closure Plan.

11.2 POST-CLOSURE ACTIVITIES

A Post-Closure Plan per KAR 28-31- 264.117 and 118 is not required for the D&Z hazardous waste storage units because of their status as waste storage facilities. All hazardous wastes will be removed and transported, and the storage facilities will be decontaminated as part of the facility closure.

11.3 CLOSURE COST ESTIMATE

The closure cost estimate for the D&Z hazardous waste management units prepared in accordance with KAR 28-31- 264.142 is attached.

11.4 FINANCIAL ASSURANCE FOR CLOSURE

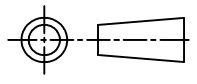
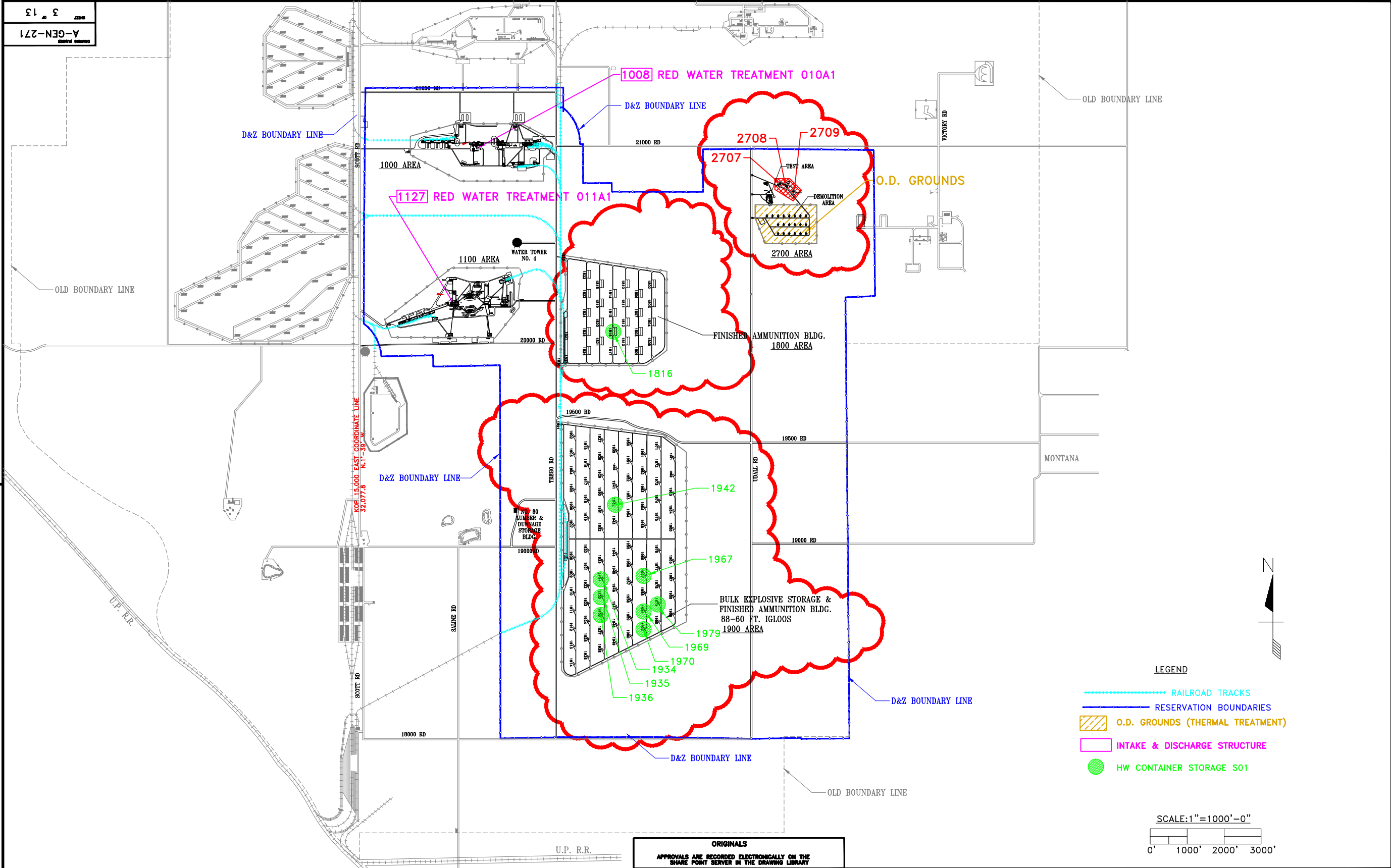
Once the closure cost estimate is approved, D&Z will establish financial assurance for closure of the facility.

SECTION 12

REFERENCES

- United States Environmental Protection Agency (EPA). "Test Methods for Evaluation Solid Waste, Physical/Chemical Methods," SW-846, 3rd Edition. On-line address:
<http://www.epa.gov/osw/hazard/testmethods/sw846/index.htm>.
- Radian Corporation. 1994. Background Metals Study, Kansas Army Ammunition Plant, Parsons, Kansas. June.

FIGURES



DRAWN PER ANSI Y14.5M-1982
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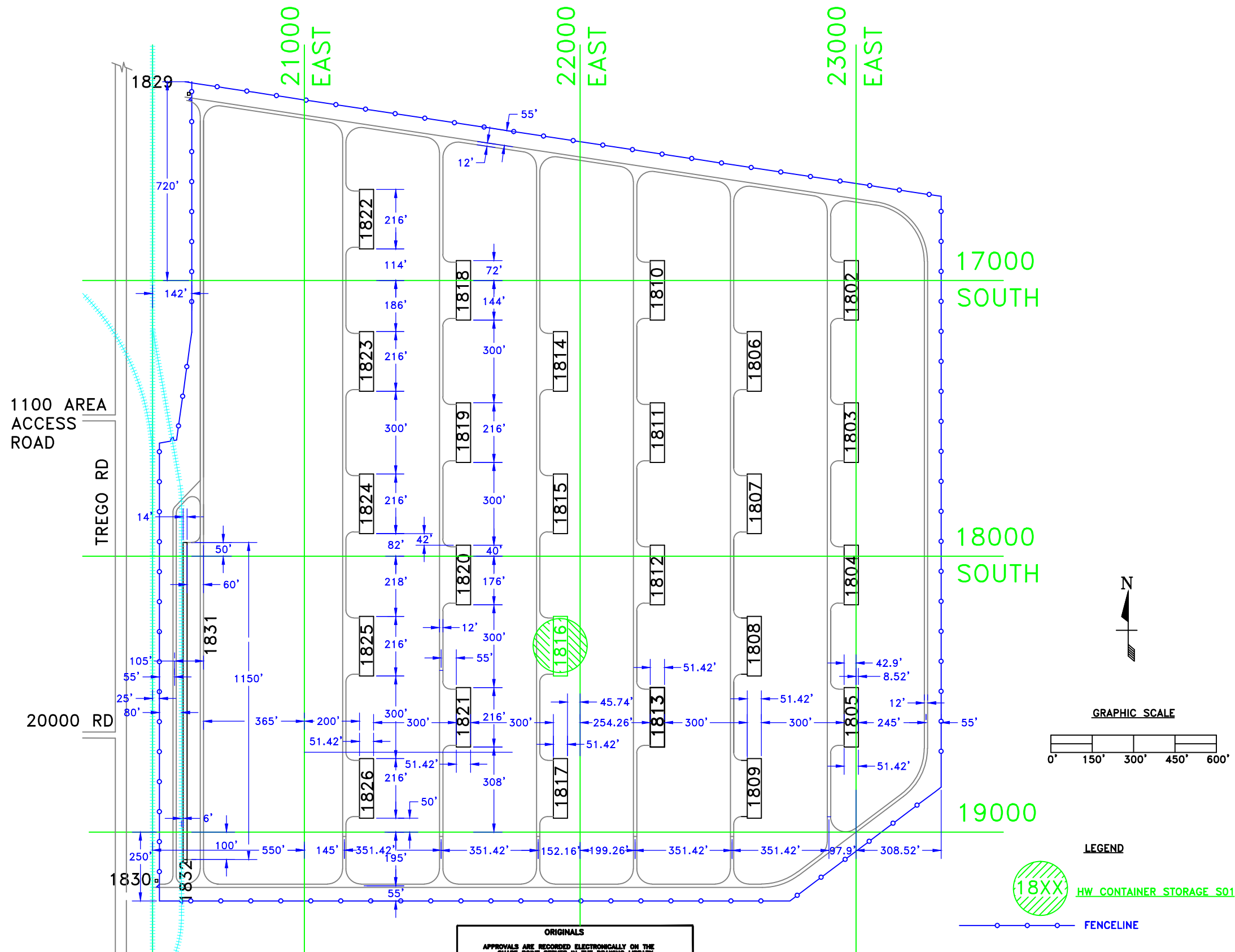
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COMMON FRACTIONS 1/16
ONE DECIMAL 0.030
TWO DECIMALS 0.015
THREE DECIMALS 0.005
ANGLE 1-4°
SURFACE FINISH ✓

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PARSONS, KANSAS 67357

HAZARDOUS WASTE STORAGE CLOSURE PLAN			
HW MANAGEMENT FACILITIES			
HW STORAGE & TREATMENT			
INTAKE & DISCHARGE STRUCTURES			
FIGURE 1			
SCALE NOTED			
REV	DATE	BY	APP'D
F	3 13	A-GEN-271	4



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MARK ON EACH PART.

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APPLICABLE TOLERANCES
UNLESS OTHERWISE NOTED.

COMMON FRACTIONS	±1/16
ONE DECIMAL	±.030
TWO DECIMALS	±.015
THREE DECIMALS	±.008
ANGLE	1°-6°
SURFACE FINISH	125



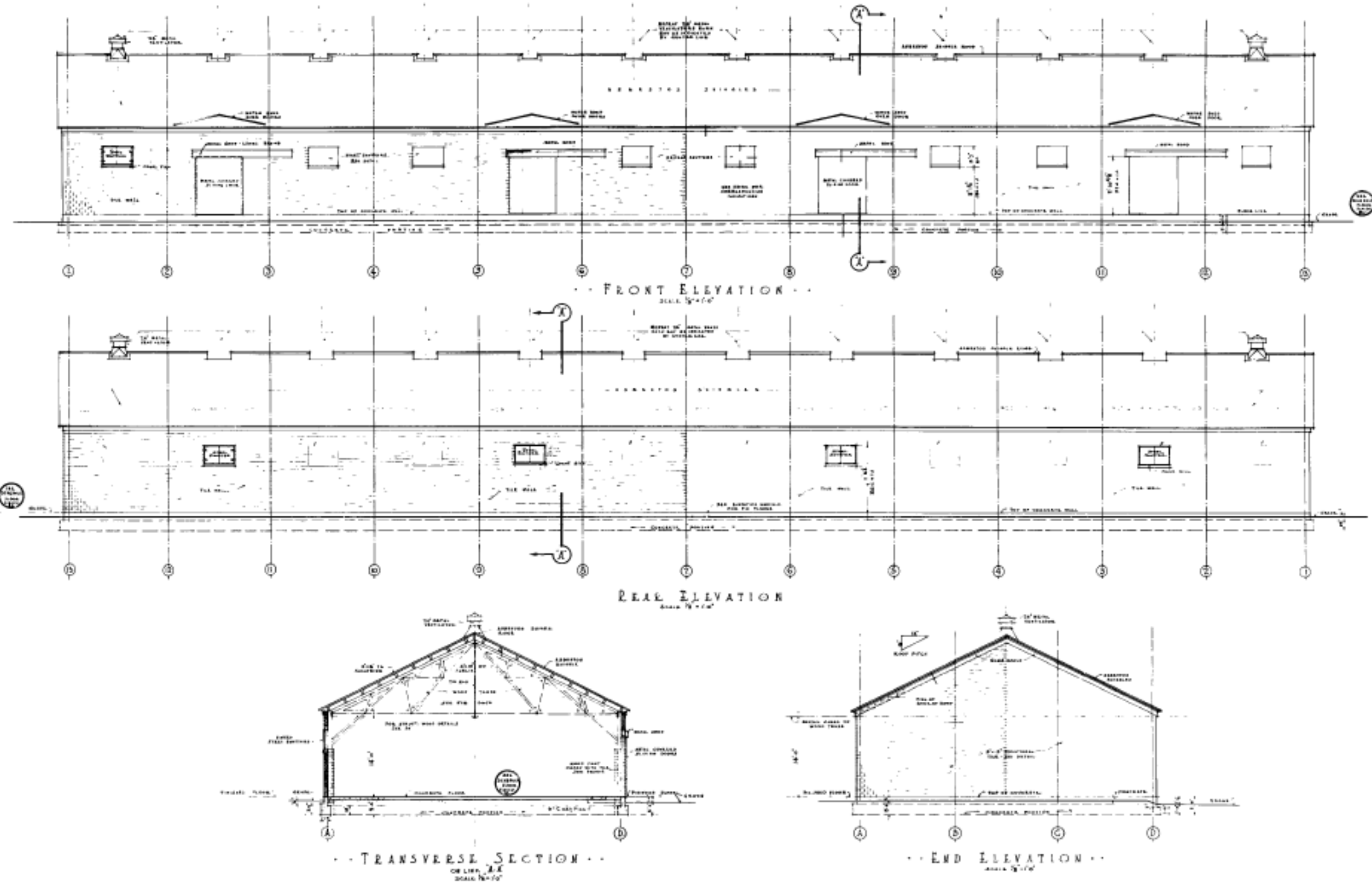
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HAZARDOUS WASTE STORAGE
CLOSURE PLAN
HW CONTAINER STORAGE
1800 AREA
FIGURE 2

AREA 1800		BLDG.	SCALE 1"=150'	
SIZE	SHEET	OF	DRAWING NUMBER	REV
F	4	13	A-GEN-271	4

DRAWN PER ANSI Y14.5M-1982
ALL DIMENSIONS ARE IN INCHES
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X:\P0834\035\10\Figure3A.Plot10

Source: National Gypsum Co., Elevation & Section, Bldg No. 1802 Thru 1826, 1988.

Not to Scale



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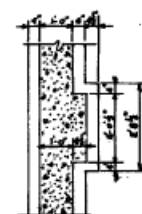
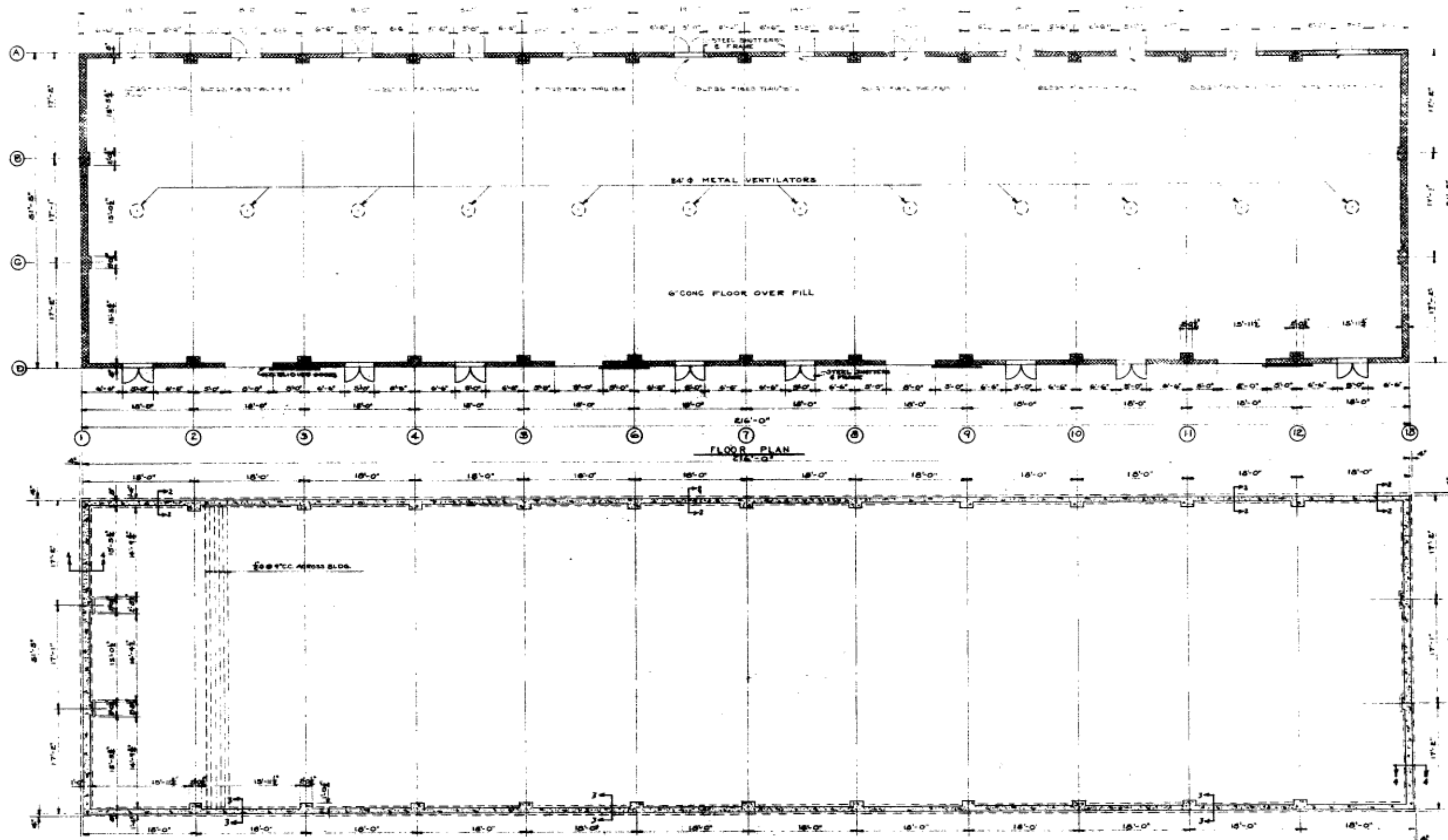
Day & Zimmermann, Inc.
 Hazardous Waste Storage Closure Plan
 Magazine Construction Plans
 Elevation and Section Plans

Figure 3a

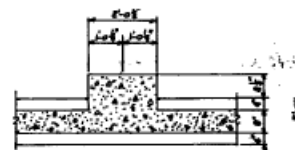
Date: 07/24/13

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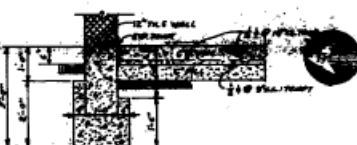
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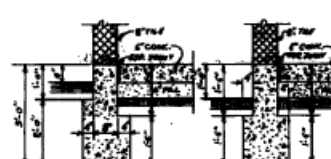
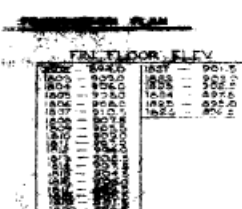
DETAIL OF PILASTER BASES
SCALE: 1/4\"/>



DETAIL OF COLUMN BASES
SCALE: 1/4\"/>



SECTION 4-4
SCALE: 1/4\"/>



SECTION 2-2 SECTION 3-3
SCALE: 1/4\"/>



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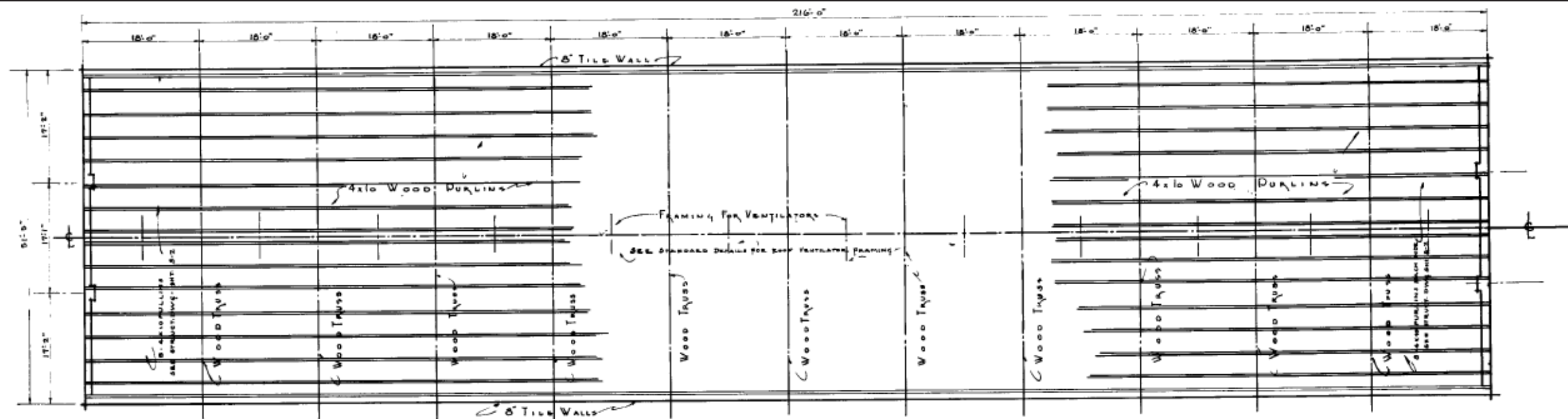
Day & Zimmermann, Inc.
Hazardous Waste Storage Closure Plan
Magazine Construction Plans
Foundation and Floor Plans

Figure 3b

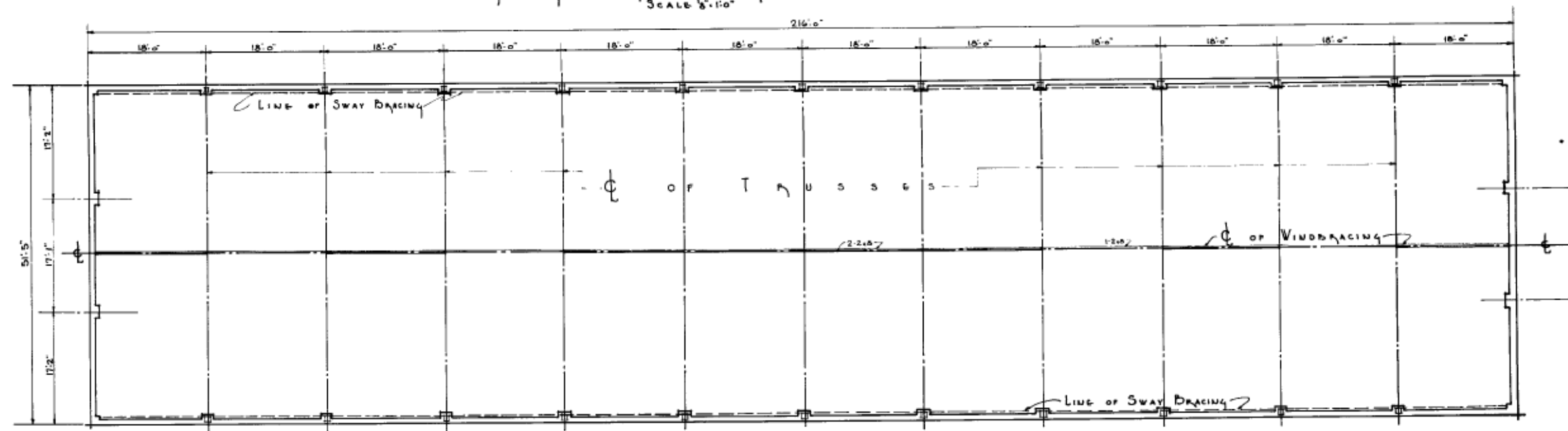
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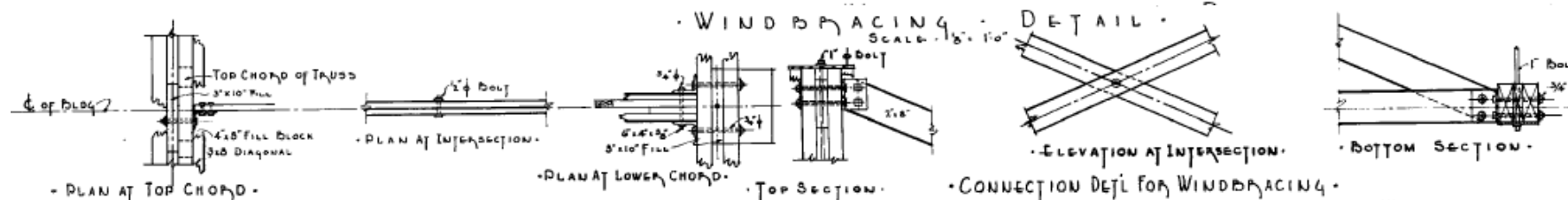
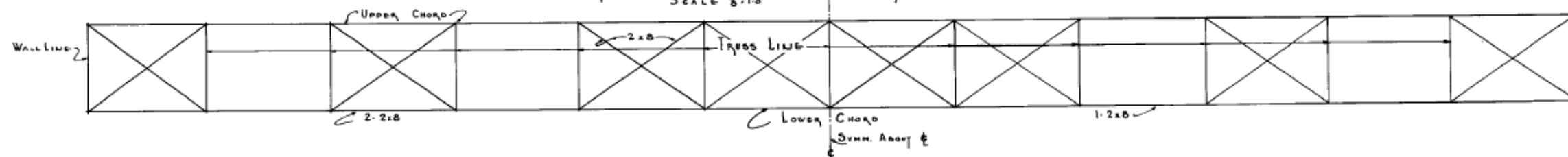
Project No: 103P0834.005



• ROOF FRAMING PLAN •
SCALE 1/8" = 1'-0"



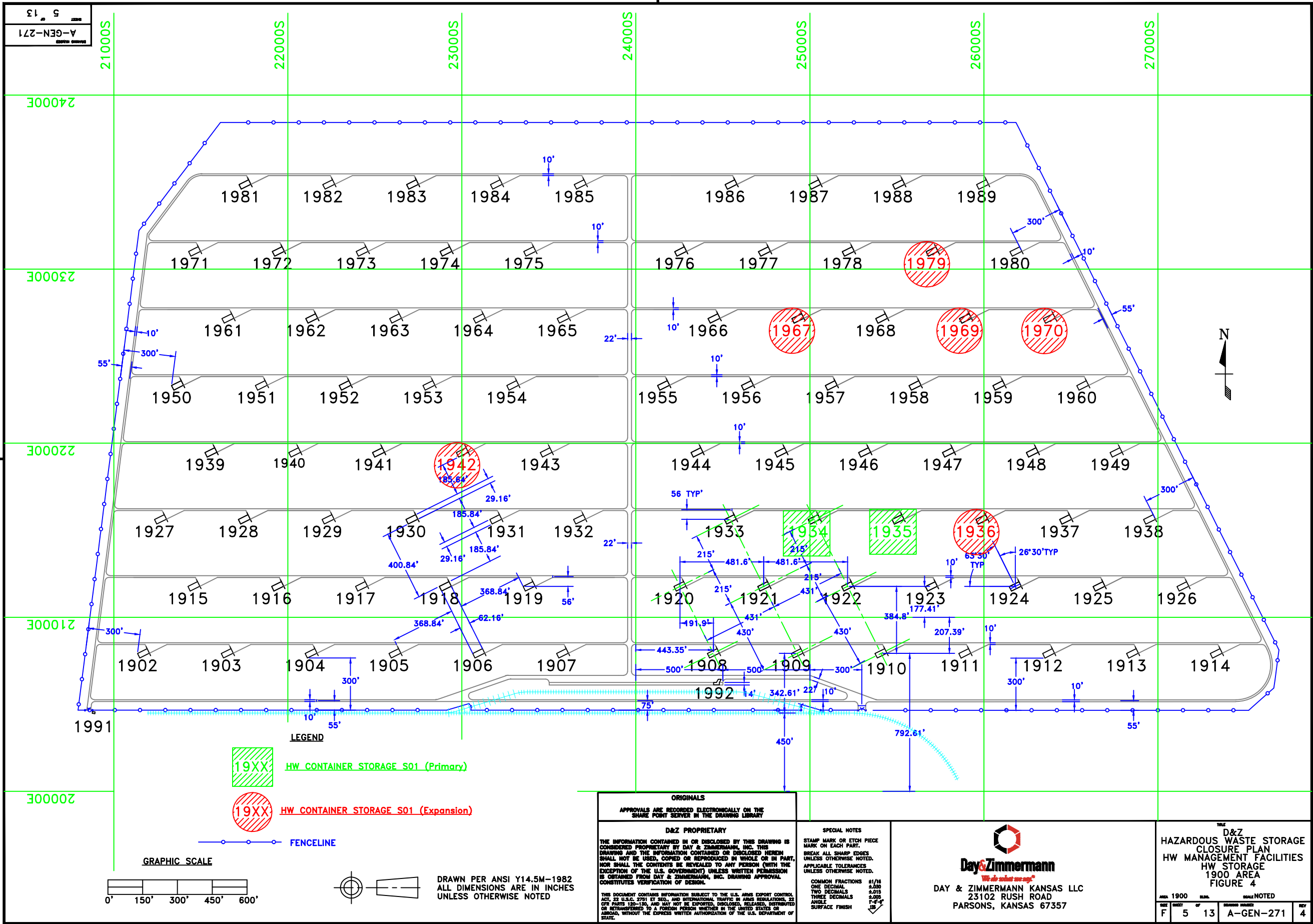
• LOWER CHORD FRAMING PLAN •
SCALE 1/8" = 1'-0"

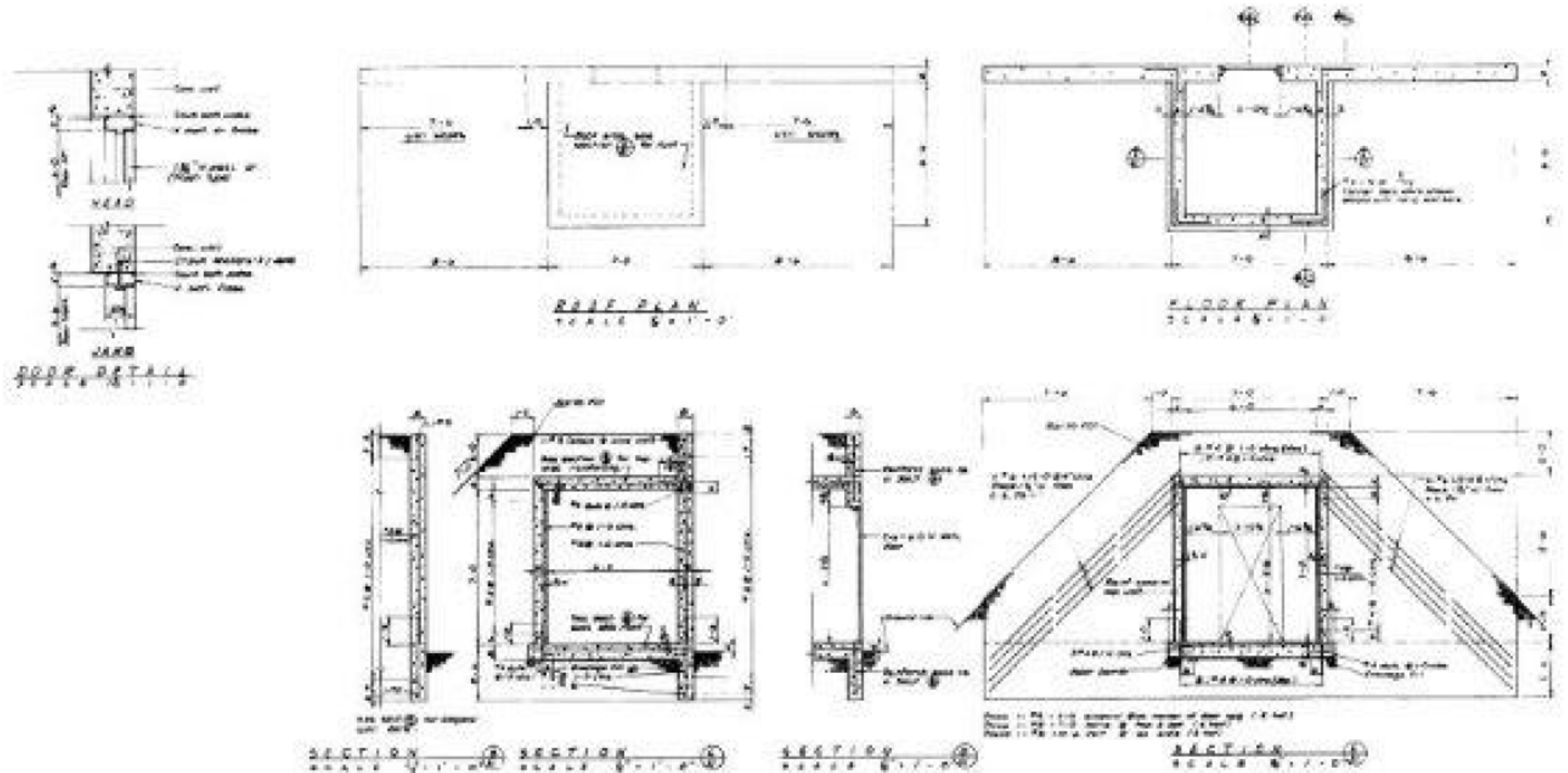


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Day & Zimmermann, Inc.
Hazardous Waste Storage Closure Plan
Magazine Construction Plans
Framing Plans

Figure 3c





RECORD DRAWING
 DRAWN BY: [Name]
 CHECKED BY: [Name]

NOTES:

1. Materials for structure to be used in construction.
2. Check materials against the drawings.
3. Check on construction including the door and lock.
4. Materials to be checked by the Designer.
5. Materials to be checked by the Designer.
6. Check door and frame inside and out.

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Day & Zimmermann, Inc.
 Hazardous Waste Storage Closure Plan
 2700 Area Igloo Construction Plans
 Floor and Elevation Plans

Figure 7

CLOSURE COST ESTIMATE

Day & Zimmermann - 1800 Area Magazine
KSR000511964

Comments:

Activity	Units	Closure Cost
Container Storage Area	1	\$729,419.14

\$729,419.14

Additional Costs \$0.00

Total Estimated Cost **\$729,419.14**

Container Storage Areas Summary (CS_02-1)

Removal of Waste (CS-03)	\$6,850.01	
Demolition and Removal of Pads (CS-04)	\$0.00	
Removal of Process Equipment (CS-05)	\$0.00	
Removal of Soil (CS-06)	\$1,997.44	
Backfill and Grading (BF-01)	\$1,260.50	
Decontamination (DC-01)	\$45,138.59	
Sampling and Analysis (SA-02)	\$11,865.83	
Monitoring Well Installation (MW-01)	\$0.00	
Transportation (TR-01)	\$45,684.00	
Treatment and Disposal (TD-01)	\$394,464.33	
User Defined Cost (UD-01)	\$42,125.00	
Subtotal of Closure Costs	\$549,385.70	
Percentage of Engineering Expenses	10.0	%
Engineering Expenses	\$54,938.57	
Certification of Closure (CS-07)	\$3,525.01	
Subtotal	\$607,849.28	
Percentage of Contingency Allowance	20.0	%
Contingency Allowance	\$121,569.86	
Landfill Closure (Cover Installation) (CI-02)	\$0.00	
TOTAL COST OF CLOSURE	\$729,419.14	

Container Storage Areas Inventory (CS_01-1)**MAXIMUM PERMITTED CAPACITY**

Volume of liquid waste	118,800.0	gal
Volume of solid waste	0.0	yd3
Percent of loose solid debris	0.0	%
Percent of drummed solid waste	0.0	%
Percent of baled waste or other monolithic waste	0.0	%
Volume of loose solid debris	0.0	yd3
Volume of solid waste in drums	0.0	yd3
Volume of monolithic waste	0.0	yd3

SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Length (excluding any curbs or berm)	216.0	ft
Width (excluding any curbs or berm)	50.0	ft
Surface Area of Containment System Pad	10,800.0	ft2
Surface Area of Containment System Pad in yd2	1,200.0	yd2

VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Thickness	0.5	ft
Volume of Containment System Pad	5,400.0	ft3
Volume of Containment System Pad in yd3	200.0	yd3

SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM BERM

Inside Perimeter	532.0	ft
Height	0.2	ft
Surface Area of Containment System Berm	106.4	ft2
Surface Area of Containment System Berm in yd2	11.8	yd2

VOLUME OF SECONDARY CONTAINMENT SYSTEM BERM

Thickness	0.3	ft
Volume of Containment System Berm	31.9	ft3
Volume of Containment System Berm in yd3	1.2	yd3

SURFACE AREA OF OTHER STRUCTURES

Surface Area of Other Structures	7,448.0	ft2
Surface Area of Other Structures in yd2	827.6	yd2

VOLUME OF OTHER STRUCTURES

Volume of Other Structures	0.0	yd3
----------------------------	-----	-----

Facility: Day & Zimmermann

Unit: 1800 Area Magazine

10/16/2013

VOLUME OF CONTAMINATED SOIL TO BE REMOVED

Length	216.0	ft
Width	10.0	ft
Depth	0.5	ft
Volume of Contaminated Soil to be Removed	1,080.0	ft3
Volume of Contaminated Soil to be Removed in yd3	40.0	yd3

AREA OF SITE TO BE GRADED WITHOUT SOIL REMOVAL

Length	0.0	ft
Width	0.0	ft
Area of Site to be Graded Without Soil Removal	0.0	ft2
Area of Site to be Graded Without Soil Removal in yd2	0.0	yd2

- Notes:**
- * This unit consists of a single magazine building (1813).
 - * The 2009 plan states that wastes in this magazine consist of liquids.
 - * The dimensions of the berm were not stated. The dimensions provided for the berms in the igloos were used for this unit.
 - * The surface area of other structures consists only of the interior walls (14 ft x 532 feet). The volume of other structures was not estimated because the building is not destined for demolition.
 - * The area of the loading dock likely will need excavation to a distance of 10 feet from the building and to a depth of 6 inches. The loading dock is assumed to run the entire length of the building.

Container Storage Areas Removal of Waste (CS_03-1)**REMOVAL OF LOOSE SOLID DEBRIS**

Volume of loose debris waste	0.0	yd3
Choose the appropriate level of PPE		Protection Level D
Labor and equipment cost per yd3	\$1.76	per yd3
Cost to Remove Loose Solid Debris	\$0.00	

REMOVAL OF DRUMMED WASTE

Number of Drums	2,160	Drums
Choose the appropriate level of PPE		Protection Level D
Labor and equipment cost per drum	\$3.06	
Cost to Remove Waste in Drums	\$6,609.60	

REMOVAL OF SOLID MONOLITHIC WASTE

Number of monolithic forms	0.0	Forms
Choose the appropriate level of PPE		Protection Level D
Labor and equipment cost per form	\$12.21	per Form
Cost to Remove Monolithic Waste	\$0.00	

DRY SWEEP STORAGE PROCESS, HANDLING AREA

Surface area to dry sweep	10,800.0	ft2
Surface area to dry sweep in thousand square feet (MSF)	10.8	MSF
Labor and equipment cost per ft2	\$22.26	per MSF
Cost to Dry Sweep Area	\$240.41	
TOTAL COST OF WASTE REMOVAL	\$6,850.01	

Notes: * Assumed Level D protection.

Container Storage Areas Removal of Soil (CS_06-1)

Volume of contaminated soil to be removed	40.0	yd3
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per work hour	\$91.63	
Work rate required to remove one yd3	0.0300	Work hr per yd3
Number of hours required to remove soil	1.2	Work hrs
Subtotal of labor and equipment cost to remove soil	\$109.96	
Number of debris box containers needed to hold soil	2	Containers
Cost of one 20-yd3 -capacity debris box container (rent per week)	\$729.74	per Container
Cost of debris box containers	\$1,459.48	
Cost of mobilization and demobilization (flat rate)	\$428.00	
TOTAL COST OF REMOVAL OF SOIL	\$1,997.44	

Facility: Day & Zimmermann

Unit: 1800 Area Magazine

10/16/2013

Container Storage Areas Certification of Closure (CS_07-1)

Number of units requiring certification of closure	1	Units
Cost of certification of closure per unit	\$3,525.01	
TOTAL COST OF CERTIFICATION OF CLOSURE	\$3,525.01	

Facility: Day & Zimmermann

Unit: 1800 Area Magazine

10/16/2013

Backfill and Grading Summary (BF_01-1)

Backfilling Excavated Areas (BF-02)	\$1,260.50
Grading to Provide Positive Slope (BF-03)	\$0.00
Backfilling Storage, Process, and Containment Pits (BF-04)	\$0.00
TOTAL COST OF BACKFILL AND GRADING	\$1,260.50

Backfilling Excavated Areas (BF_02-1)**VOLUME OF EXCAVATED AREA**

Volume	40.0	yd3
Compaction factor	0.2500	
Volume of additional fill required because of compaction factor	10.0	yd3
Total volume of fill needed	50.0	yd3

BACKFILL AREA

Labor, material, and equipment cost per yd3	\$16.65	per yd3
Subtotal of labor, material, and equipment cost to backfill	\$832.50	
Cost of mobilization and demobilization (flat rate)	\$428.00	
TOTAL COST OF BACKFILL	\$1,260.50	

Notes: * The pad is expected to remain in place. Only the volume of soil excavated adjacent to the loading dock will require backfill.

Facility: Day & Zimmermann

Unit: 1800 Area Magazine

10/16/2013

Decontamination Summary (DC_01-1)

Decontamination of Unit by Steam Cleaning or Pressure Washing (DC-02)	\$41,853.42
Decontamination of Unit by Sandblasting (DC-03)	\$0.00
Decontamination of Heavy Equipment (DC-04)	\$3,285.17
TOTAL COST OF DECONTAMINATION	\$45,138.59

Decontamination by Steam Cleaning or Pressure Wash (DC_02-1)

Area of unit to be decontaminated	18,354.4	ft2
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per hour	\$56.30	per Work Hour
Work rate to steam clean or pressure wash one ft2	0.0405	Work hr per ft2
Number of hours required to steam clean or pressure wash the unit	743.4	Work hrs
Subtotal of labor and equipment costs to decontaminate unit by steam cleaning or pressure washing	\$41,853.42	
Ratio of decontamination fluid to area	1.0	gals per ft2
Volume of decontamination fluid generated	18,354.4	gal
Decontamination fluid container type:	Bulk	
Number of drums required to contain decontamination fluid for removal	0	Drums
Cost of one drum	\$71.78	per Drum
Cost of drums needed to contain decontamination fluid	\$0.00	
TOTAL COST OF DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING	\$41,853.42	

Decontamination of Heavy Equipment (DC_04-1)

Number of hours needed to decontaminate all heavy equipment	4.0	Work hrs
Cost of steam cleaner rental per hour	\$7.46	per Hour
Subtotal of steam cleaner rental costs	\$29.84	
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per hour	\$58.59	per Work Hour
Subtotal of labor costs to decontaminate by steam cleaning	\$234.36	
Ratio of decontamination fluid to hour	100.0	gals per hr
Volume of decontamination fluid generated	400.0	gal
Decontamination fluid container type:	Bulk	
Number of drums required to contain decontamination fluid for removal	0	Drums
Cost of one drum	\$71.78	per Drum
Cost of drums needed to contain decontamination fluid	\$0.00	
Cost of construction of temporary decontamination area for heavy equipment.	\$1,969.72	
Cost of demolition of temporary decontamination area for heavy equipment.	\$1,051.25	
TOTAL COST OF DECONTAMINATION OF HEAVY EQUIPMENT	\$3,285.17	

Notes: * Assumed 3 hours for backhoe and 1 hour for drill rig.

Sampling and Analysis Inventory (SA_01-1)

Number of Drilling and Subsurface Soil Samples (2.5-inch boring)	0	Samples
Number of Drilling and Subsurface Soil Samples (4-inch boring)	0	Samples
Number of Concrete Core Samples	42	Samples
Number of Wipe Sample Locations	0	Sample Location
Number of Surface Water and Liquid Sample Locations	1	Sample Location
Number of Soil, Sludge, and Sediment Soil Samples	46	Sample Location
Number of Groundwater Sample Locations	0	Sample Location
Number of Lysimeters to be Sampled	0	Lysimeters

Notes: * Assumed 42 locations for subslab soil sampling (30 primary and 12 additional)
* Assumed 2 locations for soil confirmation samples (after excavation).
* Assumed 1 sample for characterizing decon fluids.
* Assumed 2 soil samples for characterizing soil for disposal.

Sampling and Analysis Summary (SA_02-1)

Drilling and Subsurface Soil Sample - 2.5-Inch-Diameter-Holes (SA-03)	\$0.00
Drilling and Subsurface Soil Sample - 4-Inch-Diameter-Holes (SA-04)	\$0.00
Concrete Core Sample (SA-05)	\$2,733.36
Wipe Sample (SA-06)	\$0.00
Surface Water and Liquid Sample (SA-07)	\$365.47
Soil, Sludge, and Sediment Sample (SA-08)	\$8,767.00
Groundwater Sample (SA-09)	\$0.00
Soil-Pore Liquid Sample (SA-10)	\$0.00
Analysis of Subsurface Soil Sample (SA-11)	\$0.00
TOTAL SAMPLING AND ANALYSIS COST	\$11,865.83

Concrete Core Samples (SA_05-1)**COLLECTION OF CORE SAMPLES**

Number of corings to be drilled	42	Coring Samples
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per work hour	\$65.08	per Work Hour
Work rate to drill each core sample to a 6-inch depth	1.0000	Work hrs per Sample
Number of hours required to drill 3-inch-diameter boring	42.0	Work hrs
Cost of Collection per Sampling Event	\$2,733.36	per Event

ANALYSIS OF DRILLING SAMPLE

Cost of Analysis per Sampling Event	\$0.00	per Event
-------------------------------------	--------	-----------

SAMPLING EVENTS

Number of sampling events	1	Events per yr
TOTAL COST OF SAMPLING AND ANALYSIS OF CORE SAMPLES	\$2,733.36	

Notes: * No concrete samples are anticipated. This worksheet is only to estimate the cost of coring concrete to collect subslab soil samples.

Surface Water and Liquid Samples (SA_07-1)**COLLECTION OF SURFACE WATER AND LIQUID SAMPLES**

Number of sampling locations	1	Sample Location
Choose the appropriate level of PPE		Protection Level D
Labor and equipment cost per work hour	\$78.65	per Work Hour
Work rate required to collect samples from one sampling location	0.5000	Work hrs per Sample
Number of hours required to collect all samples	0.5	Work hrs
Cost of Collection per Sampling Event	\$39.33	per Event

ANALYSIS OF SURFACE WATER AND LIQUID SAMPLES

Cost of Analysis per Sampling Event	\$326.14	per Event
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SAMPLING EVENTS

Number of sampling events	1	Events
TOTAL COST OF SAMPLING AND ANALYSIS OF SURFACE WATER AND LIQUID SAMPLES	\$365.47	

Notes: * Assumed 1 sample for characterizing decon fluids.

* Assumed analysis for 8 RCRA metals (Methods 6010 and 7471) and VOCs (Method 8240).

* The methods needed for nitrogen explosives (Method 8330). These are included as a user defined cost.

Facility: Day & Zimmermann

Unit: 1800 Area Magazine

10/16/2013

Surface Water and Liquid Samples (SA_07)

Cost of Analysis per Sampling Event

Method		Standard	Qty	Quick	Qty	Total
Mercury, cold vapor (SW 7470) with prep	Liquid	\$41.20	1	\$82.40	0	\$41.20
Metals (SW 6010), per each metal	Both	\$13.73	7	\$27.46	0	\$96.11
Volatile organic analysis (SW 5030/SW 8240)	Both	\$188.83	1	\$377.66	0	\$188.83

Soil, Sludge, and Sediment Samples (SA_08-1)

COLLECTION OF SOIL, SLUDGE, AND SEDIMENT SAMPLES

Number of sampling locations	46	Sample Location
Choose the appropriate level of PPE		Protection Level D
Labor and equipment cost per work hour	\$66.42	per Work Hour
Work rate required to collect samples from one sampling location	1.0000	Work hrs per Sample
Number of hours required to collect all samples	46.0	Work hrs
Cost of Collection per Sampling Event	\$3,055.32	per Event

ANALYSIS OF SOIL, SLUDGE, AND SEDIMENT SAMPLES

Cost of Analysis per Sampling Event	\$5,711.68	per Event
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SAMPLING EVENTS

Number of sampling events	1	Events
TOTAL COST OF SAMPLING AND ANALYSIS OF SOIL, SLUDGE, AND SEDIMENT SAMPLES	\$8,767.00	

- Notes:**
- * Assumed 42 locations for subslab soil sampling (30 primary and 12 additional).
 - * Assumed 2 locations for soil confirmation samples (after excavation).
 - * Assumed 2 soil samples for characterizing soil for disposal.
 - * All samples but 12 additional samples were analyzed for 8 metals (Methods 6010 and 7471) and VOCs (Method 8240). The methods needed for nitrogen explosives (Method 8330) are not in CostPro. These are included as a user defined cost.
 - * Assumed 12 additional samples analyzed for Appendix VIII. These are included as a user defined cost.
 - * The 2 samples for waste characterization will not be analyzed for the full TCLP suite. The 20x rule will be used to determine if additional TCLP sampling is needed.

Facility: Day & Zimmermann

Unit: 1800 Area Magazine

10/16/2013

Soil, Sludge, and Sediment Samples (SA_08)

Cost of Analysis per Sampling Event

Method		Standard	Qty	Quick	Qty	Total
Metals, flame, per each (SW 7000s)	Both	\$13.73	34	\$27.46	0	\$466.82
Metals (SW 6010), per each metal	Both	\$13.73	238	\$27.46	0	\$3,267.74
Volatile organic analysis (SW 5030/SW 8240)	Both	\$188.83	34	\$377.66	0	\$6,420.22

Treatment and Disposal Summary (TD_01-1)

Treatment and Disposal of Wastes (TD-02)	\$387,640.00
Treatment and Disposal of Decontamination Fluids (TD-03)	\$6,824.33
Total Cost of Treatment and Disposal	\$394,464.33

Treatment and Disposal of Waste (TD_02-1)**SOLID WASTE TREATMENT AND DISPOSAL**

Solid Waste Type (Optional: Enter Name)	Excavated soil	
Volume in yd3 of solid waste to be treated and disposed of	40.0	yd3
Treatment and disposal costs per yd3	\$25.00	per yd3
Cost to Treat and Dispose of Solid Waste	\$1,000.00	

LIQUID WASTE TREATMENT AND DISPOSAL

Liquid Waste Type (Optional: Enter Name)	0	
Volume in gallons of liquid waste to be treated and disposed of	0.0	gal
Treatment and disposal costs per gallon	\$0.00	per Gallon
Cost to Treat and Dispose of Liquid Waste	\$0.00	

DRUMMED WASTE TREATMENT AND DISPOSAL

Drummed Waste Type (Optional: Enter Name)	Drummed waste	
Number of drums to be treated and disposed of	2,160	Drums
Treatment and disposal costs per drum	\$179.00	per Drum
Cost to Treat and Dispose of Drummed Waste	\$386,640.00	
TOTAL COST FOR TREATMENT AND DISPOSAL OF WASTE	\$387,640.00	

Notes: * Assumed the average cost for disposal of each drum of hazardous liquid.

* Assumed that the excavated soil is nonhazardous.

Treatment and Disposal of Decon Fluid (TD_03-1)**Volume of decontamination fluid generated from closure activities**

Volume of decontamination fluid from Primary Unit	0.0	gal
Volume of decontamination fluid generated by steam cleaning or pressure washing (DC-02)	18,354.4	gal
Volume of decontamination fluid from heavy equipment (DC-04)	400.0	gal
Total Volume of Decontamination Fluid	18,754.4	gal
Choose the appropriate level of PPE	Protection Level D	
Labor and equipment cost per hour	\$66.26	per Work Hour
Work rate to pump decontamination fluid to a holding tank	0.0001	Work hr per gal
Number of hours required to pump decontamination fluid to a holding tank	1.87544	Work hrs
Subtotal of labor and equipment costs to pump decontamination fluid to a holding tank	\$124.27	
Number of days required to rent a holding tank	1	Days
Holding tank rental fee (10,000 gal tank per day)	\$161.78	per Day
Number of tanks required	2	Tanks
Subtotal of tank rental costs	\$323.56	
Cost for treatment and disposal	\$0.34	per Gallon
Treatment and disposal costs for bulk liquid	\$6,376.50	
TOTAL COST TO TREATMENT AND DISPOSE OF DECONTAMINATION FLUID AS A BULK LIQUID	\$6,824.33	

Facility: Day & Zimmermann -
Magazine 1813

Unit: 1800 Magazine

10/16/2013

Transportation of Waste (TR_01-1)

TRANSPORTATION OF WASTE IN DRUMS

Number of drums of waste	2,160	Drums
Number of truckloads needed to transport waste in drums	27	Truckloads
Type of waste		Hazardous
Number of miles	300.0	Mi
Cost per mile	\$5.64	per Mile
Cost to transport one truckload of 55-gallon drums	\$1,692.00	per Truckload
Cost to transport Waste in Drums	\$45,684.00	

TRANSPORTATION OF BULK LIQUID

Gallons of liquid waste	0.0	gal
Number of truckloads needed to transport bulk free liquid waste	0	Truckloads
Type of waste		Hazardous
Number of miles	300.0	Mi
Cost per mile	\$5.64	per Mile
Cost to transport one truckload of bulk liquids	\$1,692.00	per Truckload
Cost to Transport Bulk Liquid Wastes	\$0.00	

TRANSPORATION OF BULK WASTE

Number of waste debris boxes	0	Containers
Number of truckloads needed to transport bulk waste	0	Truckloads
Type of waste		Hazardous
Number of miles	300.0	Mi
Cost per mile	\$5.64	per Mile
Cost to transport one truckload of bulk waste	\$1,692.00	per Truckload
Cost to Transport Bulk Waste	\$0.00	
TOTAL COST OF TRANSPORTATION OF WASTE	\$45,684.00	

User Defined Activity (UD_01-2)

NAME OF CLOSURE OR POST-CLOSURE ACTIVITY	Analysis for explosives	
Number of units of work to be performed	0	
Type of unit	Tons	
Appropriate level of PPE	Protection Level B	
Labor, material, and equipment cost per work hour	\$0.00	
Work rate to perform one unit of activity	0.0000	Work hrs per Unit
Number of hours required to perform activity	0.0	Work hrs
Additional cost per unit	\$0.00	per Unit
Cost to conduct activity	\$0.00	
Other cost(s) associated with this activity		
Description of other costs	Analysis for nitrogen explosives (decon fluid)	
Cost	\$175.00	
Description of other costs	Analysis for nitrogen explosives (soil)	
Cost	\$5,950.00	
Description of other costs	0	
Cost	\$0.00	
Description of other costs	0	
Cost	\$0.00	
Description of other costs	0	
Cost	\$0.00	
TOTAL COST OF USER DEFINED ACTIVITY	\$6,125.00	

Notes: * Assumed cost for 8330 analysis is 175 dollar per sample.

* Assumed 1 decon fluid sample and 34 soil samples

User Defined Activity (UD_01-1)

NAME OF CLOSURE OR POST-CLOSURE ACTIVITY	Analysis for Appendix VIII constituents	
Number of units of work to be performed	0	
Type of unit	Tons	
Appropriate level of PPE	Protection Level B	
Labor, material, and equipment cost per work hour	\$0.00	
Work rate to perform one unit of activity	0.0000	Work hrs per Unit
Number of hours required to perform activity	0.0	Work hrs
Additional cost per unit	\$0.00	per Unit
Cost to conduct activity	\$0.00	

Other cost(s) associated with this activity

Description of other costs	Appendix VIII analysis
Cost	\$36,000.00
Description of other costs	0
Cost	\$0.00
Description of other costs	0
Cost	\$0.00
Description of other costs	0
Cost	\$0.00
Description of other costs	0
Cost	\$0.00
TOTAL COST OF USER DEFINED ACTIVITY	\$36,000.00

Notes: * Assumed cost for Appendix VIII is 3000 dollar per sample.

* Assumed 12 samples

APPENDIX I-2

OPEN DETONATION GROUNDS CLOSURE PLAN

CLOSURE PLAN
CLOSURE OF RCRA PERMITTED OPEN DETONATION GROUNDS

Revision 01

July 2015

Prepared for
DAY & ZIMMERMANN KANSAS LLC



Prepared by:
Tetra Tech
415 Oak Street
Kansas City, Missouri 64106

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
ACRONYMS AND ABBREVIATIONS	iii
SECTION 1 INTRODUCTION	5
SECTION 2 FACILITY DESCRIPTION	6
2.1 FACILITY LOCATION	6
2.2 Facility Operation	6
2.3 OD Grounds Site Description	6
2.4 Wastes Treated at the OD Grounds	11
2.5 Environmental Setting	12
2.5.1 Climate	12
2.5.2 Topography	12
2.5.3 Surface Water	12
2.5.4 Geology	12
2.5.5 Groundwater	13
SECTION 3 CLOSURE PLAN APPROACH	14
3.1 Closure Performance Standard	14
3.2 Partial Closure and Final Closure Activities	14
3.3 Closure Activities	14
3.3.1 Geophysical Survey	15
3.3.2 Surface Clearance of MEC	15
3.3.3 Subsurface Removal of Munitions	15
3.3.4 Treatment and Disposal of Munitions	16
3.3.5 Soil Sampling	16
3.3.6 Groundwater Sampling and Analysis	17
3.3.7 Closure Cleanup Goals	18
3.3.8 Interim Closure Report/Revised Closure Plan	18
3.3.9 Site Cleanup, Inventory Removal, and Disposal of Decontamination Equipment	19
3.3.10 Final Closure Report and Closure Certification	19
3.3.11 Closure Cost Estimate	20
3.3.12 Financial Assurance Mechanism for Closure	20
3.3.13 Post-Closure Plan	20
3.3.14 Post-Closure Use of Property	20
3.3.15 Post-Closure Care	20
3.3.16 Post-Closure Security	20
3.3.17 Post-Closure Contact	21
3.3.18 Monitoring Plan	21
3.3.19 Post-Closure Notices	21
SECTION 4 CLOSURE SCHEDULE	22
4.1 Schedule for Closure	22

4.2	Extensions for Closure Time	23
SECTION 5 CLOSURE PROCEDURES		24
5.1	Surface Clearance of MEC and Setting Up Staging Area	24
5.2	Surveying of Grids for Geophysics.....	24
5.3	Geophysical Survey	24
5.3.1	Geophysical Prove Out	25
5.3.2	Geophysical Data Collection	25
5.3.2.1	Anomaly Reacquisition	25
5.3.2.2	Geophysical Data Analysis.....	26
5.3.2.3	Geophysical Dig Sheets.....	26
5.4	Removal of Subsurface Metallic Items.....	27
5.4.1	Mechanical Excavation and Sifting	28
5.4.2	Hand Excavation.....	28
5.4.3	Munitions Identification	29
5.4.4	Disposal of Recovered Scrap.....	29
5.4.5	Processing of Inert MEC Items.....	29
5.5	Surface Soil Sampling	30
5.6	Subsurface Soil Sampling.....	30
5.7	Sampling Equipment Decontamination Procedures	30
5.8	IDW Management.....	30
5.9	Sample Analysis and Validation.....	31
5.9.1	Sample Analysis	31
5.9.2	Field Quality Control Procedures	31
5.9.2.1	Blanks.....	31
5.9.2.2	Duplicates.....	32
5.9.2.3	Matrix Spike/Matrix Spike Duplicate (MS/MSD)	32
5.9.3	Data Validation.....	32
5.10	Health and Safety Procedures	33
5.10.1	Hazwoper-Regulated Tasks	33
5.10.2	Non-Hazwoper-Regulated Tasks	34
5.11	MEC Hazard Controls	34
5.12	Approach For Establishing Cleanup Goals.....	35

FIGURES

2-1	Site Location Map
2-2	Facility Map
2-3	2700 Area Map
3-1	Open Detonation Grounds
3-2	Outside Fence Clearance Area
3-3	SWMU Group 17 Groundwater Monitoring Wells with 2012 Potentiometric Surface (Fall 2012)
4-1	Closure Schedule

TABLES

2-1	General Description of Compounds Thermally Treated or Stored at D&Z
2-2	Estimated Maximum Type and Amount of Wastes Thermally Treated At OD Grounds
3-1	Sample Summary
5-1	Site Specific Remediation Goals

ACRONYMS AND ABBREVIATIONS

ASTM	American Society for Testing and Materials
ATV	All-terrain vehicles
bgs	below ground surface
BIP	Blow-in place
CAP	Corrective Action Plan
CBU	Cluster bombs
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
COC	Chain-of-custody
COPC	Contaminants of Potential Concern
D&Z	Day & Zimmermann Kansas LC
DOD	Department of Defense
DOT	Department of Transportation
DQO	Data Quality Objectives
EOD	Explosive ordnance disposal
EPA	United States Environmental Protection Agency
EZ	Exclusion zone
F	Fahrenheit
ft	feet
GIS	Geographical Information System
GPO	Geophysical prove out
GPS	Global Positioning System
HSM	Health and Safety Manager
IDW	Investigation Derived Waste
KDHE	Kansas Department of Health and Environment
KDNBF	Potassium dinitrobenzofuran
KSAAP	Kansas Army Ammunition Plant
LBS	Pounds
LCS	Laboratory Confirmation Sampling
MCL	Maximum Contaminant Level
MDL	Method Detection Limit
MEC	Munitions and explosive constituents
mm	Millimeter

MS/MSD	Matrix Spike/Matrix Spike Duplicate
OD	Open detonation
OE	Ordnance and explosives
ORS	Ordnance related scrap
PEP	Propellants, explosives, or pyrotechnics
PPE	Personal Protective Equipment
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RL	Reporting Limit
RSK	Risk-Based Standards
RSL	Regional Screening Level
SOP	Standard Operating Procedure
SSL	Soil Screening Level
SUXOS	Senior UXO Supervisor
SW-846	USEPA Publication, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods"
TCLP	Toxicity Characteristic Leaching Procedure
TO	Technical Order
USACE	United States Army Corps of Engineers
USCS	Unified Soil Classification System
UTS	Universal Treatment Standards
UXO	Unexploded ordnance
UXOSO	UXO Site Safety Officer
VOC	Volatile Organic Compound

SECTION 1 INTRODUCTION

Day & Zimmermann Kansas LCC (D&Z) has prepared this Closure Plan for the Open Detonation (OD) grounds onsite the D&Z facility at the former Kansas Army Ammunition Plant (KSAAP) in Parsons, Kansas. The closure of the OD grounds refers to the process by which the OD grounds are closed to prevent or minimize future impacts to human health or the environment.

The OD grounds have been operated under interim status of the Resource Conservation and Recovery Act (RCRA) in accordance with the Part B Hazardous Waste Facility Operations Permit Application submitted by D&Z to the U.S. Environmental Protection Agency (EPA) in 2003. A Closure Plan for the OD grounds was submitted by D&Z in 2003. This Closure Plan for the OD grounds amends the December 2003 Closure Plan for site closure.

The OD grounds are located on the former KSAAP property that was formerly owned by the U.S. Army. The OD grounds are currently owned by D&Z. D&Z will be responsible for the environmental cleanup of the OD grounds. Upon completion of closure, D&Z will submit to the EPA and Kansas Department of Health and Environment (KDHE) a certification, by an independent registered professional engineer, that the OD grounds have been closed in accordance with the specifications in the approved Closure Plan. This Closure Plan will be updated as necessary by issuing either page changes or new copies, as appropriate, to all plan addressees.

D&Z plans to close the OD ground by removal (clean closure). Clean closure occurs when any associated contamination at the OD grounds is removed to the extent that the laboratory analysis shows the contaminants remaining are either below site-specific remediation goals established in the Corrective Measures Decision document for restricted use, background levels, or if it can be determined that any contamination remaining in place at the OD grounds poses no unacceptable risk to human health and the environment through the use of risk-based cleanup levels.

The objective of this Closure Plan is to 1) provide the procedures for completing a site characterization to delineate the nature and extent of contamination, if any, associated with the OD grounds; 2) present the approach for determining if the OD grounds can be clean closed, and 3) should the OD grounds be found to pose an unacceptable risk to human health and the environment, identify the procedures for completing final closure of the OD grounds. An interim Closure Plan will present the results of the site characterization and provide a revised closure plan that will include a more detailed description of the process for closing the OD grounds, based on the results of the site characterization.

SECTION 2 FACILITY DESCRIPTION

2.1 FACILITY LOCATION

D&Z is located in the southeast corner of Kansas, approximately three miles east of the town of Parsons, and two miles south of U.S. Highway 400 in Labette County (see Figure 2-1). The facility is a privately-owned company. The original facility now occupied by D&Z was constructed in 1941-1942 and was part of what was formerly the KSAAP. D&Z has operated the facility continuously from March 1, 1970 to the present.

The facility covers approximately 4,000 acres, contains 27.4 miles of roadway, and 9.25 miles of railroad. D&Z has over 954,574 feet of building and storage areas. The Union Pacific Railroad serves the facility. The surrounding land use is primarily agricultural and industrial – owned and managed by the Great Plains Development Authority.

2.2 FACILITY OPERATION

In the past, the D&Z facility's operations included loading detonation bombs (100 pounds [lbs], 250 lbs, 750 lbs, and 1,000 lbs), cluster bombs (CBU), and artillery ammunition (105 millimeter [mm], 75 mm, and 4.2 inch shells), and 81 mm mortars. The D&Z facility manufactured various components, including fuzes, primers, detonators, relays, boosters, and supplementary charges; and reworked fired 105 mm cartridge cases (brass).

Currently there are two manufacturing areas and three storage areas located at the D&Z facility. Current operations include loading, assembling, and packing munitions items. The facility does not currently manufacture propellants, explosives, or pyrotechnics (PEP) components, but does assemble them in munition items.

2.3 OD GROUNDS SITE DESCRIPTION

The OD grounds are located in the 2700 Area (see Figure 2-2) and are used to thermally treat explosive hazardous wastes. These wastes either resulted from the installation's munitions filing and manufacturing operations, from the packing of explosive items for shipment, or from off-plant sources. A list of these hazardous wastes is presented in Table 2-1.

The OD grounds have been in use since KSAAP began operations in 1942. The OD grounds encompass approximately 37 acres in surface area. The site layout (see Figure 2-3) consist of linear earthen mounds aligned in three east-west oriented rows separated by aisles approximately 250 feet wide (i.e., of sufficient width to allow access by heavy earth-moving equipment). The OD grounds are enclosed by a 6-foot chain link fence. Warning signs for restricted entry are posted at all entrance locations.

The OD grounds accepts reject munitions items and components and PEP materials for thermal treatment. Wastes to be treated are placed in pits excavated on the south side of the permanent mounds. After the wastes are placed in the pits they are covered with dirt and detonated. Detonations are triggered via an electrical train by a remote operator located in an earthen-protected bunker. After the detonation is complete, all scrap metal and other visible residues are removed, and the pits utilized for detonation are backfilled and graded to the natural ground elevation.

TABLE 2-1

**GENERAL DESCRIPTION OF COMPOUNDS THERMALLY
TREATED OR STORED AT D&Z**

PROPELLANTS:

Name	Chemical Formula	Hazardous Waste ID No.
Nitrocellulose	$C_{12}H_{16}(ONO_2)_4O_6$	D003
Nitroglycerin	$C_3H_5N_3O_9$	D003
Nitroguanidine	$CH_4N_4O_2$	D003

Note: These three primary constituents can be used singularly or in various combinations with metals, metallic salts, and organic polymer binders.

PRIMARY EXPLOSIVES:

Name	Chemical Formula	Hazardous Waste ID No.
Lead azide	N_6Pb (71% Pb)	D003, D008
Mercury fulminate	$C_2HgN_2O_2$ (70.5% Hg)	P065, D003, D009
Diazodinitrophenol (DDNP)	$C_6H_2N_4O_5$	D003
Lead styphnate	$C_6HN_3O_8Pb$ (44.2% Pb)	D003, D008
Tetracene	$C_{18}H_{12}$	D003
Potassium Dinitrobenzofuroxane (KDNBF)	$C_6H_2N_4O_6K$	D003
Lead Mononitroresorcinate	$C_6H_3NO_2Pb$ (57.5% Pb)	D003, D008

Note: The primary compositions are mixtures of primary explosives, fuels, oxidizers, and binders, including the following:

Name	Chemical Formula	Hazardous Waste ID No.
Fuels:		
Lead thiocyanate	$Pb(SCN)_2$ (64% Pb)	D003, D008
Antimony sulfide	S_5Sb_2	D003
Calcium silicide	$CaSi_2$	D003, D001
Oxidizers:		
Potassium chlorate	ClO_3K	D003
Ammonium perchlorate	NH_4ClO_4	D003
Barium nitrate	N_2O_6Ba	D003, D005

ALIPHATIC NITRATE ESTERS:

Name	Chemical Formula	Hazardous Waste ID No.
1,2,4-Butanetriol trinitrate (BTN)	$C_4H_7N_3O_9$	D003
Diethyleneglycol dinitrate (DEGN)	$C_4H_8N_2O_7$	D003
Nitroglycerine (NG)	$C_3H_5N_3O_9$	D003
Nitrostarch (NS)	$C_6H_{10}O_5NO_2$	D003
Pentaerythritol tetranitrate (PETN)	$C_5H_8N_4O_{12}$	D003
Triethylene glycoldinitrate (TEGN)	$C_6H_{12}O_4N_2O_4$	D003
1,1,1-Trimethylolethane trinitrate (TMETN)	$C_5H_9O_9N_3$	D003
Nitrocellulose	$C_{12}H_{16}(ONO_2)_4O_6$	D003

TABLE 2-1 (Continued)

**GENERAL DESCRIPTION OF COMPOUNDS THERMALLY
TREATED OR STORED AT D&Z**

NITRAMINES:

Name	Chemical Formula	Hazardous Waste ID No.
Cyclotetramethylene tetranitramine (HMX)	C ₄ H ₈ N ₈ O ₂	D003
Cyclotrimethylene tetranitramine (RDX)	C ₃ H ₆ N ₆ O ₆	D003
Ethylenediamine dinitrate (EDDN; Haleite)	C ₂ H ₆ N ₄ O ₄	D003
Nitroguanidine (NQ)	CH ₄ N ₄ O ₂	D003
2,4,6-Trinitrophenylmethylnitramine (Tetryl)	C ₇ H ₅ N ₅ O ₈	D003

NITROAROMATICS:

Name	Chemical Formula	Hazardous Waste ID No.
Ammonium picrate (Explosive D)	C ₆ H ₃ N ₃ O ₇ H ₃ N	D003
1,3-Diamino-2,4,6-trinitrobenzine (DATB)	C ₆ H ₄ N ₅ O ₆	D003
2,2',4',6',6'-Hexanitroazobenzene (HNAB)	C ₁₂ N ₈ O ₁₂	D003
Hexnitrostilbene (HNS) trinitrobenzene	C ₁₄ H ₂ N ₆ O ₁₂	D003
1,3,5-Triamino-2,4,6-trinitrobenzene (TATB)	C ₆ H ₆ N ₆ O ₆	D003
2,4,6-Trinitrotoluene (TNT)	C ₇ H ₅ N ₃ O ₆	D003
Ammonium nitrate	HN ₄ NO ₃	D003

Note: The compositions are mixtures of the above compounds.

Name	Chemical Formula	Hazardous Waste ID No.
Plastic Bonded Explosives (PBX)	Varied	D003

Note: Plastic bonded explosives include mixtures of the above compounds, polymer binders, plasticizer, and fuel (aluminum or iron).

PYROTECHNICS:

Note: Pyrotechnics are composed of a combination of an oxidizer (oxygen or fluorine), fuel (powdered aluminum or magnesium), and binding agents (resins, waxes, plastics, oils, retardants, waterproofing, and color intensifiers).

MISCELLANEOUS:

Name	Chemical Formula	Hazardous Waste ID No.
Sludge from settling sumps, wash vacuum	Unknown	D003

The estimated types of munitions thermally treated at the OD grounds are depicted in Table 2-2. Military chemical warfare agents, smokes, and related compounds are not treated at the OD grounds.

TABLE 2-2

**ESTIMATED MAXIMUM TYPE AND AMOUNT OF WASTES
THERMALLY TREATED AT OD GROUNDS**

	DODIC	HAZARD CLASS/DIVISION CG	UNO SERIAL #	CIIC	N.E.W./QDLB.
CTG, 60MM, HE, M720A1	--	1.2E	--	--	0.8902
CTG, 60MM, HE, M768	BA17	1.2.2E	321	3	0.8825
FIN ASSEMBLY, M27 F/60MM (INERT)	--	INERT	--	--	0
CTG, 8LMM HE M821A1	C868	1.1E	6	4	2.342
CTG, 81MM, HE M821A2	--	1.1E	--	--	2.3536
CTG, 81MM HE M889A1	C869	1.1E	6	4	2.3536
CTG, 81MM HE M889	C869	1.2.1E	321	3	2.0693
FIN ASSEMBLY, M24 F/81MM	--	INERT	--	--	0
CARTRIDGE, IGNITION M299	C990	1.4 G	325	--	0.017
CARTRIDGE, IGNITION M702	B617	1.4 G	320	--	0.00767
FUZE, M734A1	NA23	1.1.1 D	367	--	0.018829
FUZE, M774	--	1.4 D	--	--	0.0005
FUZE, M783	NA19	1.4S	367	4	.018830
FUZE, M935	N342	1.2.2D (1.2 B)	409	4	0.0302
FUZE, M935	N342	1.4D	409	4	0.0021
FUZE, M223 F/M42/46 GRENADES	--	1.4 D	--	--	0.00019
FUZE, M774 FOR LOSMP	--	1.4 D	--	--	0.0005
S&A, LOSMP, XM-1069	--	1.4 D	--	--	0.000584
CHARGE, PROPELLING, M235	--	1.3 C	272	--	0.01657
CHARGE, PROPELLING, M220	C044	1.3 C	242	--	0.086717
GRENADE, M42 HE	--	1.1 D	--	--	0.6652
GRENADE, M46 HE	--	1.1 D	--	--	0.068
PROJECTILE, 155MM, HE, M795 (OXSCAN)	--	1.1 D	--	--	24.1
PROJECTILE, 155MM, HE, M795 (TNT)	D529	1.1D	168	7	24.1000
SEPARTOR ASSEMBLY	--	1.4 S	--	--	0.017
TRANSFER LINE, EJECTOR YELLOW	--	1.4 S	--	--	0.000381
TRANSFER LINE, EJECTOR BLACK	--	1.4 S	--	--	0.000381
TRANSFER LINE, EJECTOR BLUE	--	1.4 S	--	--	0.000381

TABLE 2-2 (Continued)

**ESTIMATED MAXIMUM TYPE AND AMOUNT OF WASTES
THERMALLY TREATED AT OD GROUNDS**

	DODIC	HAZARD CLASS/DIVISION CG	UNO SERIAL #	CIIC	N.E.W./QDLB.
TRANSFER LINE, EJECTOR GREEN	--	1.4 S	--	--	0.000381
TRANSFER LINE, EJECTOR RED	--	1.4 S	--	--	0.000381
TRANSFER LINE, EJECTOR WHITE	--	1.4 S	--	--	0.000381
EJECTOR ASSEMBLY, SUBMUNITION	--	1.4 S	--	--	0.01676
MODULE ASSEMBLY, RH, EXPLOSIVE	--	1.1 D	--	--	27.01566
CHARGE, DEMOLITION, SHAPE 40 LB. M3A1	M421	1.1D	0048	2	30.0000
CHARGE, DEMOLITION, SHAPE 15 LB M2A4	M420	1.1D	48	2	15.0000
RELAY, M7, LOADING ASSEMBLY f/MT-238 Fuze	--	1.4 B	--	--	0.0002
S&A, LOSMP, XM-1069	--	1.4 D	--	--	0.000584
WARHEAD BONDING ASSEMBLY DZK1320-0125	--	1.1 D	--	--	15
WARHEAD, GUIDED MISSILE, HE (9256709-SR-STD)	--	1.1 D	--	--	6.5
MAXIMUM TOTAL DETONATIONS = (assumes a maximum of 10 – 500 pound charges/day for 100 days each year)					50,000 pounds

EXPLOSIVES (Plan to sell)
Black Powder
Comp A w/calcium stearate
Comp A-3
Comp A-3 Aluminized
Comp A-5
Comp B
Comp B w/Calcium Silicate
Comp B4 w/aluminum powder
Comp B4, type 1
Comp IMX-101
Comp IMX-104
Cyclotol
Explosive CXM-3
Explosive CXM-9, coated
HNS
LX-14-0 (HMX/Resin)

TABLE 2-2 (Continued)

**ESTIMATED MAXIMUM TYPE AND AMOUNT OF WASTES
THERMALLY TREATED AT OD GROUNDS**

EXPLOSIVES (Plan to sell)
Octol
OSX-1
OSX-3
OSX-CAN
PAX-21
PAX-21
PAX-3
PAX-46
PBXN-5
PBXN-9
PBXW-11
PBXW-14
PETN, Polyethylene Coated
RDX, Type 1 or 2
RDX, TYPE 2, CLASS 3
TETRYL
TNT, Type 1 * USE FOR DONOR CHARGE - DEMO GRDS
TNT/OCTOL Mix

Notes:

DODIC = Department of Defense Identification Code

CG = Compatibility Group

CIIC = Controlled Inventory Item Code

UNO = United Nations Organization Serial Number

N.E.W. = Net Explosive Weight

N.E.W./QDLB = Net Explosive Weight for Quantity Distance Purposes in Pounds

2.4 WASTES TREATED AT THE OD GROUNDS

In accordance with Title 40 Code of Federal Regulations (CFR) 264.112(b)(3) a closure plan needs to provide an estimate of the maximum waste inventory from the facility. Waste ordnance and munitions are neither stored nor accumulated at the OD grounds. Because these energetic materials are transported to the OD grounds on the day of treatment and treated on that day, there will be no inventory of such materials at the OD grounds at closure. The maximum daily inventory of explosive material subject to treatment at the OD grounds is also limited by the environmental performance standards. A maximum 2,000 pounds of materials (including donor) may be detonated per day. There are no hazardous wastes resulting from detonation activities. Shrapnel generated as a result of detonation activities is collected after each detonation event, then sold as scrap metal.

2.5 ENVIRONMENTAL SETTING

2.5.1 Climate

The climate in the area is temperate and continental, typical of North America, with an annual average temperature range of 46° Fahrenheit (F) to 65° F. The historical temperature extremes are -13° F in January and 107° F in July. The annual mean precipitation is 37 inches. The annual mean snowfall is 20 inches. The prevailing winds are from the south and average 10 miles/hour. The data was compiled at Parsons Tri-City Airport National Weather Service Station, Parsons, Kansas. The Parsons Station is approximately 12 miles west of Parsons on similar terrain, and the data are deemed to be representative for the D&Z facility.

2.5.2 Topography

The terrain in the vicinity of the facility is generally flat or gently rolling, with little elevation change throughout the area. The land surrounding the facility to the north, south, west, and northwest is being transferred to the Great Plains Development Authority for redevelopment. Most of it is currently being leased as agricultural land except the former ammunition plant located north and west of the facility which is currently being developed as an industrial park. The area within 1,000 feet east of the facility is currently agricultural land. U.S. Highway 400 is to the north, the Neosho River is to the east, a railroad line is to the south, and Labette Creek is to the west (see Figure 2-2). There is a large strip mine operation located to the southeast of the facility, as well as several quarries and gravel pits. There is a power plant located on the Neosho River to the east of the facility.

2.5.3 Surface Water

The D&Z facility lies within the drainage basin of the Neosho River, a tributary of the Arkansas River. A Flood Hazard Boundary Map prepared by the U.S. Department of Housing and Urban Development was utilized to delineate the approximate 100-year floodplain for watercourses in Labette County, Kansas. The OD and storage units do not lie within the boundaries of the 100-year floodplain. No barriers are necessary for flood protection for the units. Naturally occurring intermittent watercourses provide adequate drainage for the OD and storage units.

The eastern boundary of D&Z is located about 1½ miles west of the Neosho River, and Labette Creek, a major tributary of the Neosho, is located approximately 2 miles southwest of the facility. The Neosho River is utilized as a source of drinking water, and D&Z obtains its potable water from an intake on the Neosho River located about 1½ miles east and one mile north of the OD area.

2.5.4 Geology

The subsurface geology in the area of the OD grounds cannot be directly characterized due to a lack of local stratigraphic control. No borings have been made in the immediate vicinity of the OD grounds. Interpretations can be made based on existing borelogs at other locations within the boundaries of the former KSAAP. Borings 10, 11, and 12, which were drilled in the general vicinity of the OD grounds were used for interpretative purposes.

According to the information taken from these borelogs, the OD grounds subsurface is characterized by two stratigraphic units which comprise the uppermost aquifer: The Pennsylvanian Labette Shale and the Pennsylvanian Fort Scott Limestone (Jungman and Williams 1968).

The Labette Shale is present above the Fort Scott Limestone in Boring 10, but is not present in Boring 11 and 12. It is described by the driller as a yellow tan to tan gray weathered shale grading down section to a light gray shale at a depth of 17.5 feet. The base of the unit is in sharp contact with the underlying Fort Scott Limestone at a depth of 22.1 feet. According to Jungman and Williams (1968), the Labette Shale has a maximum thickness of 75 feet and contains fine-grained sandstone and sandy shale from which the highest aquifer yields have been recorded. Yields of five gallons per minute are typical for most outcrop areas.

The Fort Scott Limestone is present in all three borings. Drillers logs describe the unit as being a buff to light gray, very finely crystalline limestone occasionally interbedded with gray and black shale and rust yellow siltstone. A five-foot thick black carbonaceous shale bed is present in borings 11 and 12. Jungman and Williams (1968) describe the unit as having a maximum thickness of 28 feet and yielding small quantities of fair quality water, especially down dip from the outcrop areas.

2.5.5 Groundwater

Regionally, the lower Paleozoic aquifer system consists of two carbonate aquifers separated over a large area by a confining layer (Macfarlane and Hathaway, 1987). The upper aquifer is composed of undifferentiated Mississippian carbonates and the lower aquifer consists of rocks of the Cambrian-Ordovician System. The confining layer is characterized by rocks of the Precambrian and Pennsylvanian systems. Even though the Pennsylvanian units are considered to be confining regionally, these rocks will produce water in shallow bores screened in low yielding sandstone and limestone aquifers.

SECTION 3

CLOSURE PLAN APPROACH

In accordance with Kansas Administrative Regulations (KAR) 28-31-270.14(b)(13), 270.23(a)(2), and 264.112(a)(1) and (2) this closure plan identifies the procedures necessary to achieve closure of the D&Z OD grounds. Copies of the plan will be maintained by D&Z until closure is completed and signed by an independent professional engineer licensed in Kansas. This plan will be updated as necessary by issuing either page changes or new copies, as appropriate, to all plan addressees.

3.1 CLOSURE PERFORMANCE STANDARD

RCRA closure performance standards (KAR 28-31-264.111) are intended to protect human health and the environment as well as to minimize the need for post-closure maintenance. This goal will be achieved through clean closure. Clean closure is defined as closure to established risk-based screening levels or quantified risk-based cleanup levels based on land use, accomplished by removing hazardous wastes and hazardous waste residues from the unit that exceed these levels.

If any contamination in the form of hazardous wastes or constituents contained in soils or groundwater is determined to be the direct result of past operations of the OD grounds or is shown to be present in concentrations above cleanup goals, background concentrations, or other standards or guidance levels, further study will be done to determine the nature and extent of this contamination and what remediation requirements are needed. If warranted, an appropriate Corrective Action Plan (CAP) will be prepared and submitted to EPA for approval. Upon approval and modification of the closure plan, the CAP will then be implemented to remedy any identified contamination in soils and/or groundwater.

3.2 PARTIAL CLOSURE AND FINAL CLOSURE ACTIVITIES

Partial closure requirements under Kansas hazardous waste program [KAR 28-31-264.112(b)(1) through (b)(7)] do not apply to the OD grounds. For the purposes of determining the maximum extent of operations during the life of the facility, the area of closure will be defined as the OD grounds described in Section 2. This will include those areas that may have been impacted by past thermal treatment and/or disposal operations. Because closure will be performed for the entire OD grounds none of it will remain open.

3.3 CLOSURE ACTIVITIES

The following section provides a general description of the activities to be conducted during closure as required under Kansas hazardous waste program (KAR 28-31-264.112 and 264.114) and the rationale for the selection of these activities. Field work will not be initiated until all unexploded ordinance (UXO) safety issues are addressed with an Explosive Safety Submission. Details of the procedures to implement these activities are included in Section 5 of this closure plan.

In order to determine the nature and extent of past releases, and to close the OD grounds through clean closure, the activities described in the following section are to be completed. Upon completion of the initial closure activities, the final closure procedures will be established.

3.3.1 Geophysical Survey

To estimate the amount and extent of subsurface munitions and explosive constituents (MEC), that remain at the OD grounds a geophysical survey will be conducted. The survey will also be used to protect soil sampling teams from encountering any UXO.

This geophysical survey will be conducted using EM-61 electromagnetic geophysical equipment or equivalent over the 37 acre area inside the OD fence line and over the 569 acres outside the fence but within the 2500 ft arc shown on Figure 3-1. The equipment will be traversed across the OD grounds by a two-person geophysics team along transects that are spaced 3 feet apart. Digital geophysical readings of subsurface metallic anomalies, indicative of buried munitions, will be collected continuously along each transect. Precise locations of the geophysical anomalies, using the latitude and longitude coordinate system, will be established using a global positioning system (GPS). Items identified by the survey team will be flagged for removal by follow-on UXO removal teams. The procedures for completing the geophysical survey are detailed in Section 5 of this closure plan.

3.3.2 Surface Clearance of MEC

Prior to conducting the geophysical survey and environmental sampling, an UXO contractor will carefully inspect the OD grounds with the aid of an appropriate geophysical instrument (e.g., Schonstedt GA-52CX magnetometer or equivalent) for evidence of munitions on the ground surface.

The surface clearance will remove munitions, munitions debris consisting of metal fragments and inert munitions casings lying on the surface that could interfere with the geophysical survey. If the munitions items are safe to move they will be relocated to a designated location for treatment and disposal. However, should the munitions items exhibit a high explosive hazard, a UXO contractor will treat these items using blow-in-place (BIP) methods by destroying the item with an explosive charge that will be detonated. The BIP events will be carried out in accordance with KAR 28-31-266.206. KDHE will be notified in a timely manner of all BIP events.

The UXO Technicians will provide a detailed description of the types of munitions encountered, including any identified explosive hazards, and establish their location in the field with a GPS system.

Non-UXO-qualified personnel will be instructed to avoid working in designated hazard areas. If ordnance and explosives (OE) are discovered on the surface, subsurface activities will not be allowed unless the OD grounds can first be effectively swept of all surface OE.

3.3.3 Subsurface Removal of Munitions

The subsurface removal of MEC will focus on three different depths within the 37 acres of the OD grounds – to an average depth of 4 feet within the OD pit area (5.5 acres), to an average depth of 2 feet in the areas adjacent to the OD pits (9.7 acres), and to a depth of 1 foot in the remaining areas within the OD boundaries (15.3 acres), as identified on Figure 3-1. Selected geophysical anomalies will be excavated and removed to provide a safe working environment for the field sampling personnel. An UXO contractor will locate the geophysical anomalies with the aid of an appropriate geophysical instrument (e.g., Schonstedt GA-52CX magnetometer). In the pit areas and areas adjacent to the pits, soil will be excavated and sifted to clear the MEC. In the remaining areas, excavation of anomalies will be performed by a two-person team of UXO Technicians using hand excavation tools such as shovels, spades, trowels, and pry bars. The excavation activities will be limited to a maximum depth that will

provide for a safe working environment for the investigation crew by eliminating the subsurface explosive hazard in accordance with the procedures described in Section 5.0 of this plan.

If the munitions items are safe to move they will be relocated to one of the pits within the OD grounds for treatment by detonation. Should the munitions items exhibit an explosive hazard, the UXO contractor will treat these items using BIP methods as described in Sections 3.3.3 and 5.1. The UXO Technicians will also provide a detailed description of the types of munitions encountered, including any identified explosive hazards, and establish their location in the field with a GPS system.

3.3.4 Treatment and Disposal of Munitions

Each munitions item removed from the surface during clearance and subsurface removal activities will be inspected by UXO personnel in accordance with U.S. Army Technical Order (TO) 11A-1-60, "Inspection of Reusable Munitions Containers and Scrap Material Generated from Items Exposed to, or Containing Explosives." Based on the inspection, items determined to be inert will be certified, collected, stockpiled and transported offsite for further disposition at a metals recycling facility, when the final closure protocol for this activity is established.

Any munitions or munitions fragments suspected to still contain explosives, or items that are fuzed, will either be BIP or treated at a designated detonation pit in the vicinity of the OD grounds. Treatment of the munitions items within the detonation pit will be conducted by countercharging the items with an explosive donor charge and detonating the charge. Prior to detonation, the munitions will be covered with sand to control the kick-out of explosives and fragments. The munitions detonations will be performed under the direction and supervision of an on-site Senior UXO Supervisor (SUXOS). During these operations, an on-site UXO Site Safety Officer (UXOSO) will closely monitor these operations, strictly enforce safety and adherence to procedures, and ensure that the exclusion area is appropriately evacuated of non-essential personnel.

3.3.5 Soil Sampling

Once the proposed soil sampling locations are cleared of scrap metal and UXO, soil samples can be safely collected for analysis.

Soil sampling will be conducted as part of this closure plan to establish the extent of surface and subsurface soil contamination within the OD grounds due to past operations. The results of the sampling will be used to establish cleanup requirements and make the determination whether clean closure is feasible. Site-specific sampling locations, quantities, sample collection and analytical methods, and quality assurance/quality control (QA/QC) issues are addressed below.

Surface soil and subsurface soil samples will be collected to define the horizontal and vertical extent of soil contamination within the limits of the OD grounds. The following sampling rationale is proposed.

- The process of MEC removal within the detonation pit area – excavation and sifting – will create stock piles of surface and subsurface soils. These soils will be sampled with a five point composite sample for every 500 cubic yards of soil. In addition, a five point composite on a 50 foot center will be collected from the base and side walls of the excavation. The soil samples will be analyzed for the analytes listed in Table 3-1, metals, explosives, and perchlorate to assess the nature of the contaminants present at each of the OD pits.

- The remainder of the OD grounds, inside the fence, will be sampled on grid with 75 feet centers as shown on Figure 3-2. A soil sample will be collected from a depth of 0-2 feet bgs and will be 5 point composite within that 75 foot center. The samples will be analyzed for the analyte list shown in Table 3-1, explosives and perchlorate to assess the extent of contaminants present at the OD grounds.
- Soils outside the fence line will be sampled using an integrated sampling design (ITRC 2013). The frequency of the sampling is more intensive closer to the fence line, and decreases as one moves from the OD grounds perimeter. The samples will be collected from a depth of 0-6 inches bgs. The samples will be analyzed for the analyte list shown in Table 3-1, explosives and perchlorate to assess the extent of contaminants present at the OD grounds.

Sampling techniques that will be employed for surface soil and subsurface sampling are described in Section 5 of this closure plan. Table 3-1 provides a listing of soil sample parameters and methods and includes the number of analytical soil samples to be collected as part of this evaluation, including QA/QC samples. Details regarding the required containers, preservatives, and holding times for groundwater and soil samples are presented in Section 5 of this closure plan

TABLE 3-1
SAMPLE SUMMARY

Matrix	Purpose	Requested Analysis	Sampling Method (EPA Region 7 SOPs)	Analytical Method (EPA SW-846)
Soil	To confirm or eliminate soil contamination from on-site soils	RCRA metals, SVOCs, Explosives, and Perchlorate	4231.2012	6010C, 8270D, 8330B, 6850
Soil	(Field Duplicates) To determine laboratory accuracy through analysis of duplicate samples – 1 per 15 samples	RCRA metals, SVOCs, Explosives, and Perchlorate	4231.2012	6010C, 8270D, 8330B, 6850

Notes:

EPA U.S. Environmental Protection Agency
 RCRA Resource Conservation and Recovery Act
 SVOC Semi-volatile organic compound
 SOP Standard operating procedure

3.3.6 Groundwater Sampling and Analysis

Seven monitoring wells are installed adjacent to the OD grounds and have been sampled on a routine basis as part of the corrective action groundwater monitoring program associated with the solid waste management unit (SWMU 17) that includes the OD ground. This data has been used to establish groundwater flow direction and characterize the groundwater quality upgradient and downgradient of the OD grounds. The location of these monitoring wells and groundwater flow direction are illustrated in Figure 3-3.

The analytical data from the groundwater samples collected from the monitoring wells will be assessed to determine if the OD grounds have had an impact on groundwater quality. Based on a review of the

groundwater elevation data and groundwater quality data the need for additional monitoring wells will be evaluated.

3.3.7 Closure Cleanup Goals

The analytical results of the closure soil sampling will be compared to following hierarchy – 1) site specific KSAAP Corrective Action Remediation Goals for non-restrictive use, 2) KDHE Tier 2 Risk-Based Standards for Kansas (RSK) screening levels for a non-residential scenario, and 3) EPA industrial Regional Screening Levels (RSL). Each constituent that exceeds its appropriate remediation goal or screening level will be considered as a Contaminant of Potential Concern (COPC). The COPCs will be compared to background concentrations at the KSAAP Background Metals Study, Kansas Army Ammunition Plant, Parsons, Kansas (Radian Corporation [RC] 1994a). This document will provide the background concentrations required to make this comparison. The background data, remediation goals, RSK screening levels and RSLs will be evaluated to establish the clean closure requirements for the OD grounds.

If the closure investigation results indicate the OD grounds pose an unacceptable risk to human health and the environment, an evaluation of remedial alternatives will be completed. The evaluation will assess selected alternative against the nine Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Feasibility Study criteria to select the most appropriate remedial action for the OD grounds. In-place closure options would be considered including: installation of a soil cover and in-situ remedial technologies.

3.3.8 Interim Closure Report/Revised Closure Plan

Following the completion of the geophysical survey, the soil and groundwater investigations and the determination of cleanup goals, an Interim Closure Report will be prepared. The purpose of this report is to provide the investigation results and present the recommended approach for closing the OD grounds. In addition, the report will identify the additional closure activities that will be required to complete closure at the OD grounds.

Specific information to be provided in the Interim Closure Report will include:

- A description of the site conditions including: soil types and groundwater conditions, physical and chemical descriptions of any contamination encountered, the types of munitions identified along with their explosive hazards;
- A detailed site topographic map showing the configuration of the detonation pits and the final soil boring locations;
- A geophysical map showing the locations of the buried metallic anomalies;
- A map showing the soil analytical results exceeding background, RSK screening levels and RSLs;
- A groundwater flow map;
- A map showing the groundwater analytical results exceeding background, site-specific remediation goals, RSK screening levels and RSLs;
- An estimate of the amount of munitions remaining on site;
- An estimate of the volume of contaminated soil remaining on-site;

- A detailed plan for the completion of final closure activities for clean closure including, if required: the estimated volume of waste to be removed, the waste removal procedures, the waste disposal procedures, and verification sampling.

More detailed information on the procedures for completing the site investigations and risk assessments is provided in Section 5 of this Closure Plan.

3.3.9 Site Cleanup, Inventory Removal, and Disposal of Decontamination Equipment

As required under KAR 28-31-264.112(b)(e) and 264.114 the closure plan is to provide the procedures for the site cleanup, inventory of removal, and disposal of decontamination equipment. The waste inventory consists of (1) munitions scrap left at the surface of the pits from treatment activities; (2) untreated surface UXO; and (3) soil cuttings, decontamination fluid, and other investigation derived waste (IDW). UXO and contaminated scrap will be treated as described in Section 5. IDW will be managed in accordance with Section 5. All visible waste and debris contained within the OD grounds will be physically removed. A bermed decontamination pad constructed of 30 mil plastic will be used to contain all wash water.

Following decontamination, rinsate samples will be analyzed for Toxic Characteristic Leaching Procedure (TCLP) metals, explosive and perchlorate compounds to verify their cleanliness. Once the treatment structures are certified clean, they will be either transported to the 1900 Area Hazardous Waste Storage Area to be stored until contracted for disposal/recycling or disposed of directly. All waste generated from the decontamination process will be containerized in drums for characterization and disposal/recycling.

All contaminated debris identified as treatment residue, solid IDW, and decontamination fluids and rinsates will be placed in Department of Transportation (DOT) 17E and 17H drums, as previously described. Should sampling analysis determine these to be contaminated, each container will be closed and transported to a hazardous waste disposal facility. Remaining containers will be decontaminated and removed from the facility.

3.3.10 Final Closure Report and Closure Certification

Within 60 days of the completion of closure the D&Z will submit in writing (by certified mail) a closure certification to the EPA Regional Administrator (KAR 28-31-264.115 and 264.116). The certification will verify that the OD grounds was closed in accordance with the specifications outlined in the closure plan, including the completion of all required corrective action measures. The certification will be signed by an authorized official of D&Z and an independent professional engineer. Documentation supporting the professional engineer's certification will be furnished upon request.

The closure certification will include a final report demonstrating that the OD grounds has been closed in accordance with the approved closure plan. This report should include all inspection summary reports, problem identification and corrective measure reports, inspection data sheets, photographic reporting data sheets, acceptance reports, deviations from design and materials specifications (with justifying documentation), and as-built drawings. The final report should also include manifests, decontamination, sampling and analysis results if the approved closure plan specifies these actions. The closure activities must be documented by an independent registered professional engineer and included as part of the Certification of Closure documentation.

No later than the submission of closure certification, D&Z will also submit to the EPA Regional Administrator a survey plat indicating the location and dimensions of the facility with respect to permanently surveyed benchmarks. The plat will be prepared and certified by a professional land surveyor.

3.3.11 Closure Cost Estimate

3.3.12 Financial Assurance Mechanism for Closure

Once the closure cost estimate is approved then D&Z will establish financial assurance for closure of the facility. The closure cost estimate for the OD grounds prepared in accordance with KAR 28-31-264.142 is attached.

3.3.13 Post-Closure Plan

Because the need for the post-closure plan will be dependent on the results of the closure site investigation activities, the determination of the need for this plan will be completed following the closure activities.

3.3.14 Post-Closure Use of Property

The post-closure use of property following final closure will not be allowed if such use results in a disturbance of the OD grounds. This may endanger personnel entering the area or may result in disturbance or damage to the facility's monitoring and/or remediation systems (i.e., groundwater wells) that exist at the site. D&Z will maintain the fences, gates and monitoring devices.

3.3.15 Post-Closure Care

The post-closure care period for the site will begin after the completion of closure of the OD grounds, including all required corrective action measures, and will continue for a period of time that is dependent on whether the facility can be clean closed [KAR 28-31-270.23(a)(3) and 264.603]. This determination cannot be made until closure activities are completed.

3.3.16 Post-Closure Security

In accordance with RCRA the facility owner is to provide appropriate security [KAR 28-31-264.117(b)]. Public access to the site is currently prohibited. In addition, security is maintained with locked gates and fencing across all the roads into the site. Roadways are clearly signed indicating the hazards present and restrictions to access. The current security measures will be re-assessed during the evaluation of remedial alternatives as part of the Interim Closure Report.

3.3.17 Post-Closure Contact

Post-closure contact should be with EPA until the post-closure care period is completed [KAR 28-31-264.118(b)(3)], certified by the permittee, and signed by an independent professional engineer.

3.3.18 Monitoring Plan

Should it be determined that the site will be closed as an in-place closure, groundwater monitoring will be conducted [KAR 28-31-264.118(b)(1)] at the site during the post-closure care period (and during the closure period as well) to determine whether any remaining contamination could originate from the site (e.g., hazardous wastes or hazardous constituents from any contaminated soils that might remain in place following closure) and impact groundwater quality. Details of the post-closure monitoring will be established following completion of the closure activities.

3.3.19 Post-Closure Notices

If any wastes (determined to be hazardous) remain in place following the completion of closure activities, a record of their type, location, and quantity will be submitted to the authority with jurisdiction over local land use, and to the EPA Regional Administrator no later than 60 days following closure [KAR 28-31-264.116 and 264.119]. Additionally, a survey plat and record of the type, location, and quantity of hazardous wastes disposed of within the OD grounds will be filed with the authority with jurisdiction over local land use and with the EPA Regional Administrator. The plat will state D&Z's obligation to restrict disturbance of the hazardous waste disposal unit area in accordance with applicable KAR 28-31-Part 264 Subpart G regulations.

SECTION 4

CLOSURE SCHEDULE

4.1 SCHEDULE FOR CLOSURE

An estimated closure schedule, required by RCRA [KAR 28-31-264.112(b)(6)], that includes the time needed to complete all required closure activities is provided in Figure 4-1. The extent of requirements to fully close the site will not be known until closure activities reveal the nature and extent of any contamination in soils and groundwater. It is D&Z's intent to close this unit as a clean closure for unrestricted use, or for restricted use (industrial use only). D&Z acknowledges that if it is not possible to remove the contamination remaining the site will be closed as an in-place closure. The closure schedule may be modified based on this determination. These timeframes include the following assumptions:

- A 30-day period for the EPA and KDHE to prepare and publish a public notice for review the Draft Final Closure Plan prepared by D&Z;
- The development and approval of the Explosives Safety Submission within the duration that this Closure Plan is reviewed by EPA and the public;
- A 30-day public review and comment period following the release of the closure plan to the public;
- A 60-day period for review and approval of the Interim Closure Report by EPA and KDHE; and
- The completion of the final closure activities within 180 days from EPA approval of the Interim Closure Report.

The timeframes presented in Figure 4-1 are attributed to several subtasks that need to be completed under the main tasks. The subtasks associated with the main tasks include the following:

- Draft Closure Plan: funding appropriation, review of site history, conduct site visit, and perform aerial photograph analysis.
- Closure Plan Review by EPA and KDHE: contracting environmental subcontractors, conducting review, and preparation of written comments to D&Z.
- D&Z Revision of Draft Closure Plan: schedule meeting of EPA, KDHE and D&Z to discuss comments, prepare draft responses to comments, obtain concurrence on responses, and incorporate responses into a draft final report.
- Public Review of Draft final Closure Plan: prepare and publish public notice, hold public meeting, compile comments from the community, and prepare written comments to EPA and KDHE.
- Closure Investigation/Interim Closure Report: complete surface clearance of UXO, conduct soil and groundwater sampling, conduct sample analysis and validation, complete Interim Closure Report which will include results of investigation and the procedures for the final closure activities.

- Final Closure Activities (if required): complete removal of remaining UXO, remove remaining contaminated soil, installation of soil cover, complete verification sampling.

4.2 EXTENSIONS FOR CLOSURE TIME

If for any reason closure activities cannot be completed within the specified time frame outlined in the closure schedule, RCRA [KAR 28-31-264.113(a) and (b)] allows a request or petition for an extension of the closure time to be submitted to the EPA and KDHE. This petition will identify the need for the extension, the status of the facility, and the actions required to prevent threats to human health or the environment during the extension period. The written request will include a copy of the amended closure plan.

SECTION 5

CLOSURE PROCEDURES

In accordance with RCRA requirements KAR 28-31-264.112 and 264.114 the following section provides a description of the procedures that will be implemented during closure of the OD grounds.

5.1 SURFACE CLEARANCE OF MEC AND SETTING UP STAGING AREA

Prior to conducting the geophysical survey and environmental sampling, the UXO contractor will carefully inspect the OD grounds with the aid of an appropriate geophysical instrument (e.g., Schonstedt GA-52CX magnetometers or equivalent) for evidence of OE/MEC partially or fully exposed on the ground surface. MEC clearance will remove munitions, munitions debris consisting of metal fragments and inert munitions casings lying on the surface that could interfere with the geophysical survey. If the munitions items are safe to move they will be relocated to one of the existing detonation pits for treatment by detonation. However, should the munitions items exhibit a high explosive hazard, the UXO contractor will treat these items using BIP methods by destroying the item with an explosive charge that will be detonated. KDHE will be notified in a timely manner of all BIP events.

The BIP events are anticipated to be carried out in accordance with KAR 28-31-266.204, which exempts the action from normal permit requirements. All MEC operations will be performed under the direction and supervision of an on-site SUXOS. During these operations, an on-site UXOSO will closely monitor these operations, strictly enforce safety and adherence to procedures, and ensure that the exclusion area is appropriately evacuated. The UXO Technicians will mark any OE/MEC or other hazards by encircling the hazard with flagging tape. Non-UXO-qualified personnel will be instructed to avoid working in designated hazard areas. If OE/MEC is discovered on the surface, mechanical equipment will not be used unless the area can first be effectively swept of all surface OE/MEC.

5.2 SURVEYING OF GRIDS FOR GEOPHYSICS

Where practical, positional data will be collected from a GPS unit. A GPS base will be set up on an established control point, and real time corrections broadcast to the roving GPS unit via a radio link. The roving GPS antenna may be mounted in the center of the coils to track the EM-61 or, in areas where limited coverage exists due to terrain or vegetation, the rover may be used to locate survey cell corners for data conversions and interpolation from a local coordinate system. From these control points wooden hubs or stakes will be set on a grid spacing throughout the area of investigation. Using the employed control points, the geophysical crew will establish a grid for data collection. In areas that exhibit inadequate GPS coverage, highly accurate data positioning will be maintained through the use of an instrument survey (e.g., "staff and rod" surveying from control points). This method will serve as a backup to GPS and be used when GPS technology is adversely affected by local vegetation or topographic conditions.

5.3 GEOPHYSICAL SURVEY

The objectives of the geophysical work are 1) geophysical instrument prove-out and evaluation and 2) geophysical data collection, which includes anomaly reacquisition (utilizing the same geophysical instrumentation and temporary markers [i.e., pin flag, paint, or other semi-permanent markers]), geophysical data analysis, and the creation of target maps and dig-sheets.

5.3.1 Geophysical Prove Out

The initial phase of the investigation will be an evaluation of the proposed geophysical instrumentation. An established “prove-out” area, consistent with the local site conditions (geological, topographical, and vegetation conditions), will be seeded with known items (similar to those discovered during surface clearance) at various depths from just below ground surface to 3 feet bgs within the fence of the OD grounds and surface to 2 feet bgs outside the fence within the 2,500 foot explosive fragment arc, and used by the geophysical contractor for the evaluation. An inductively coupled metal detector (EM-61) followed by a cesium-vapor total field magnetometer (Sinter Smartmag SM-4), in conjunction with a base station magnetometer, will be evaluated across the entire prove-out area using the same survey techniques determined to be suitable for the investigation.

The geophysical prove out (GPO) will be established to identify the most optimum and accurate sensor, sensor platform, positioning methods, data density and data processing techniques. The optimum geophysical data collection method will be based primarily on the detection depth capabilities and false alarm rate. The GPO will also allow for evaluation of the operators and functionality of the geophysical sensors.

The GPO test plot will be established with 20 to 30 seeded items (targets) representative of those items expected to be found at the site. The depths and orientations of the items will be varied to effectively evaluate the instrumentation and operators.

Specifics regarding the GPO, instrumentation, and operators will be given in the Closure Report.

5.3.2 Geophysical Data Collection

5.3.2.1 Anomaly Reacquisition

Target anomalies will be re-acquired by the geophysical contractor using the GPS system where appropriate. Coordinate locations of each targeted anomaly will be uploaded into the rover, which will be used to navigate or re-occupy the point where a temporary mark will be placed. Reacquisition of target locations where no GPS coverage exists will be conducted using tape measures pulled from corner stakes to locate the interpreted local x,y coordinate position listed for each target on the dig sheet. Each reacquired target location will be marked with a pin flag labeled with the anomaly’s identifying number as specified on the dig sheet.

Using the same geophysical equipment as was originally used, the reacquisition crew will then refine the location of the anomaly. This will be accomplished by collecting readings in continuous mode while slowly maneuvering the instrument over the anomaly, searching for the peak response. The pin flag will be moved to the refined location and the offset will be documented.

The geophysical contractor will also provide, a grid map, which contains the following:

1. Grid identification
2. Grid corner locations and coordinates
3. Contoured data

4. Anomaly locations with unique identification numbers

As soon as practical after collection, the geophysical field data shall be provided in delineated fields as x, y, z, v (1), v (2), etc., for delivery. Maps that display the geophysical anomalies with annotated, interpreted and identified physical features shall be delivered in MicroStation (.dgn) and Geosoft compatible format.

5.3.2.2 Geophysical Data Analysis

The raw data is displayed on the screen as a color contour image with the track plot overlaid on the map. The purpose of this initial exercise is to assess the positioning and density of the data.

Geophysical data processing will include the following procedures:

1. Conversion of local grid coordinates to Kansas State Plane coordinates
2. Diurnal Drift Correction (magnetics)
3. Heading corrections
4. Lag corrections
5. Normalization or leveling (removal of background)
6. Gridding of data
7. Digital filtering and enhancement
8. Calculating the 3D analytic signal from the magnetic data
9. Gridding of analytic signal
10. Selection of anomaly picks (above an appropriate threshold)
11. Preparation of geophysical maps and target maps

5.3.2.3 Geophysical Dig Sheets

The geophysical contractor will, using a qualified geophysicist, analyze the geophysical data for each geophysical grid, identify anomalies that may represent buried UXO, and prepare anomaly lists containing the following information:

1. Project site
2. Geophysical contractor
3. Responsible geophysicist
4. Grid identification
5. Grid corner locations and coordinates

6. Unique anomaly identification numbers
7. Predicted anomaly easting & northing in State Plane coordinates
8. Instrument peak value at each anomaly location

The dig-sheets will be prioritized and anomalies deemed more likely to be UXO, will be ranked higher than anomalies less likely to be UXO. The criteria for selecting and locating anomalies for the anomaly (or target) list include the following items:

1. The maximum amplitude of the response with respect to local background conditions
2. The lateral extent (width) of the response
3. The 3-dimensional shape of the response
4. The location of the response with respect to the edge of the grid, unsurveyable areas, land features, cultural features, or utilities within or adjacent to the grid
5. The shape and amplitude of the response with respect to the response of known targets buried in the geophysical prove-out test plot
6. The shape and amplitude of the response with respect to relevant anomalies encountered in previous OE removal grids
7. The apparent depth of the anomaly
8. Potential distortions in the response due to interference from nearby cultural features; any instrument or grid survey QC that could affect the analysis

5.4 REMOVAL OF SUBSURFACE METALLIC ITEMS

For each specific site, all metallic anomalies evaluated as potential UXO will be selected for intrusive investigation to a depth deemed necessary to provide safe working conditions for the environmental sampling efforts. The targets will be reacquired using tape measures and/or calibrated ropes in conjunction with an appropriate reacquisition instrument, and excavated by hand. The personnel, vehicles, equipment, and mobilization/demobilization tasks required for completion of the intrusive aspect of the field investigation are described in the following subsections.

A restricted/exclusion zone (EZ) shall be established around the area where intrusive activities are conducted, in accordance with Section 6 of this plan. Initially, a 300-ft EZ will be established at each location where intrusive activities are being conducted. If UXO is located during excavation, the EZ will be adjusted to 1,250 feet for non-fragmenting explosive materials; and 2,500 feet for fragmenting explosive materials. While UXO removal operations are in progress, only those personnel necessary for the operation will be allowed within the EZ. If nonessential personnel enter the area, all UXO removal operations will cease.

During anomaly validation actions, the UXO Technician III will assign UXO Technicians one or more anomalies to investigate. Validation of anomalies will be performed by a two person team of UXO Technicians using hand excavation tools to a maximum depth of 3 feet to eliminate any potential

explosive hazards to the investigation crew. If removal of items at depths of greater than 3 feet is necessary mechanical means will be employed.

5.4.1 Mechanical Excavation and Sifting

In the OD pits and areas adjacent to the pits soils will be excavated using an armored loader and then placed in a mechanical sifter to remove the MEC. The soils in the pit area as shown in Figure 3-2 will be excavated to an average depth of 4 feet bgs and the areas adjacent to the pits as shown in Figure 3-2 to an average depth of 2 feet bgs. The following basic technique will be used for anomaly excavation.

1. The UXO Technician will use the results of the geophysical survey to identify areas of concern.
2. Soils will be removed in two foot lifts and placed in the sifter unit and the MEC removed.
3. Once the soil is removed, the UXO Technician will rescan the area to locate any additional anomalies. If anomalies are identified an additional two feet of soil will be excavated, sifted, and MEC removed. This process will continue until no anomalies are identified or bedrock is reached.
4. Sifted soils will be stock piled and one 5-point composite sample will be taken of each 500 cubic yards of removed soils to determine if the soil may be returned to the excavation. Until the anomaly is identified otherwise, it is assumed the anomaly is UXO. Excavation will be initiated adjacent to the subsurface anomaly.

5.4.2 Hand Excavation

Small hand tools such as shovels, spades, trowels, and pry bars will be used to access potential UXO. The hand excavation activities will be limited to a necessary for safe work area access. Hand tools will be used for the majority of items, which generally are found near the surface. The following basic technique will be used for anomaly excavation:

1. The UXO Technician will relocate the anomaly with an appropriate geophysical instrument.
2. Until the anomaly is identified otherwise, it is assumed the anomaly is UXO. Excavation will be initiated adjacent to the subsurface anomaly. The excavation will continue down until the excavated area has reached a depth below the top of the anomaly as determined by frequent inspection with an appropriate geophysical instrument, or until the maximum depth of excavation required by the work plan is reached.
3. Using progressively smaller and more delicate tools to carefully remove the soil, the excavation team will expand the sidewall to expose the metallic item in the wall of the excavation for inspection and identification without moving or disturbing the item.
4. Once the item is exposed for inspection, the excavation team will determine whether it is a munitions item.
5. If the item is a munitions item, the procedures of Section 5.4.2, Munitions Identification, will apply.
6. If the item is not a munitions item, it will be removed and the area will be rechecked with the magnetometer to assess if munitions are hidden beneath it. The excavation team will then

annotate the results of the excavation on the anomaly tracking sheet and move on to the next marked subsurface anomaly.

5.4.3 Munitions Identification

When an item is positively identified as munitions, the UXO Technician III, SUXOS, and UXOSO will be notified along with the D&Z OE/MEC Safety Representative. The UXO Technician will carefully remove enough soil, without disturbing the munitions item, to facilitate positive identification or to obtain identification features. UXO Technicians will make every effort to identify munitions through visual examination of the item for markings and other identifying features such as shape, size, and external fittings. Items will not be moved during the inspection/identification until the fuze condition can be ascertained. If the condition is questionable, the fuze will be considered armed. The SUXOS and the UXOSO will agree on the positive identification of the item and the disposition of the item before implementing any disposal operations.

When OE that cannot be moved safely is discovered, and the area can withstand a highorder detonation, then the item will be BIP by countercharging the item with an explosive donor charge and detonating the donor charge. All explosive disposal operations will be performed under the direction and supervision of the UXO subcontractor on-site SUXOS. During these operations, the contractor's on-site UXOSO will closely monitor these operations, strictly enforce safety and adherence to procedures, and ensure that the exclusion area is appropriately evacuated. Engineering controls or protective measures will be employed where required to minimize the damage from BIP operations. These controls may consist of earthen works, sandbags, trenching, buttressing, taping of glass, mounding, flooding, and venting to reduce the effects of detonation.

5.4.4 Disposal of Recovered Scrap

Ordnance related scrap (ORS) materials that have been in direct contact with energetic materials of the ordnance (e.g., expended rocket motors, shell casings, and warhead fragments) will be visually inspected by at least two MEC personnel, and will be certified free of energetic materials that would pose an explosive safety hazard, if appropriate. Certified safe ORS will be containerized and disposed of in an approved landfill or at an approved recycling facility. Materials that cannot be certified as safe from explosive hazards will be handled for further processing by explosives personnel.

Metal debris that is not ordnance-related (e.g., rebar, angle iron, and sheet metal) is not classified as hazardous waste and will be consolidated at the site in a separate container.

5.4.5 Processing of Inert MEC Items

Inert ordnance items will be demilitarized in accordance with Department of Defense (DoD) 4160.21-M, Defense Reutilization and Marketing Manual, and DoD 4160.21-M-1, DoD Demilitarization Manual. In general, treatment of all MEC will be performed using standard demolition practices. All disposal operations will be performed under the direction and supervision of an on-site SUXOS and UXOSO. Operations will be closely monitored, safety strictly enforced, procedures will be adhered to, and an exclusion zone will be maintained with only essential personnel present.

5.5 SURFACE SOIL SAMPLING

Sampling techniques that may be employed for surface soil sampling include stainless steel trowel sampling and stainless steel hand auger sampling, depending on the nature of the material to be sampled. A stainless steel trowel will typically be used to collect samples of loosely packed materials and a stainless steel hand auger for densely packed materials. Surface soil samples will be obtained from two depths – 0- to -6 inches bgs and 0- to -2 feet bgs used to investigate releases from the detonation activities that resulted in deposition to the surface soils.

5.6 SUBSURFACE SOIL SAMPLING

The densities and the presence of UXO will dictate subsurface soil sampling methodologies. The subsurface sampling will be limited to the areas including and immediately adjacent to the detonation pits. Based on the OD operation, this is the area most likely to contain any subsurface contamination. As noted earlier, the method to be used to remove MEC from this area will be excavation and sifting. This process will create stock piles of surface and subsurface soils. These soils will be sampled to determine if they contain contamination above remediation goals, background, or risk based remediation goals. One 5-point composite sample will be taken for every 500 cubic yards of soil. In addition, 5 point composite samples will be taken on 50 centers along the base and along the side walls of the excavation. The samples from the base will be collected with a hand auger to the depth of 0-1 feet and the side walls will be sampled to a depth of 0 – 6 inches from the side wall.

The soil samples will be analyzed for the analytes listed in Table 3-1, metals, explosives, and perchlorate to assess the nature of the contaminants present at each of the OD pits.

5.7 SAMPLING EQUIPMENT DECONTAMINATION PROCEDURES

All field sampling equipment will be pre-cleaned prior to arrival on-site and decontaminated in accordance with the procedures detailed in the Tetra Tech sampling Standard Operating Procedure (SOP) Number 05 as discussed in the site-wide QAPP (Tetra Tech 2013). A decontamination area will be established and maintained on-site for all decontamination activities. The site will be selected by the sampling team based on the location's ability to isolate the decontamination area and assist in preventing cross contamination of sampling equipment.

5.8 IDW MANAGEMENT

All wastes generated from field sampling and decontamination activities will be treated as contaminated media until data are available to determine their actual characteristics. This material will be drummed and stored in the OP-1 facility pending the outcome of sampling analysis. Specifics such as date, time, equipment being decontaminated, and the associated sample identification number for the equipment being decontaminated will be recorded in a field logbook. Liquids will be drummed separately from solids, and the drums will be properly labeled. It is anticipated that IDW will consist of decontamination fluids and rinsates, contaminated personal protective equipment (PPE), and soil cuttings. Segregation, minimization, handling, and labeling of IDW will be performed. Solid IDW will be placed in DOT 17H drums. All groundwater, decontamination fluids, and rinsates will be placed in DOT 17E drums. Each drum will be clearly labeled and dated the day it is filled using indelible ink and have the following source identification:

Contaminated media will be managed in accordance with the current federal hazardous waste rules. For instance, if concentrations of samples collected from decontamination/rinsate fluids exceed the Universal Treatment Standards (UTS) of KAR 28-31-268.40 or the maximum contaminant levels (MCLs), whichever is higher, the drummed waste will be considered a hazardous waste and will be managed accordingly. All soils with hazardous constituent concentrations exceeding the UTS or the soil screening levels (SSLs) (i.e., cleanup goals), whichever is lower, are considered hazardous waste and similarly managed. Wastes determined to be hazardous will be picked up by a contractor for transport to a permitted disposal facility.

If the results indicate none of the UTS or SSL/MCL concentrations have been exceeded, wastewater and/or soils are not considered hazardous waste and will be managed in accordance with KDHE solid waste regulations.

All sanitary trash and uncontaminated PPE will be discarded in accordance with applicable solid waste regulations.

5.9 SAMPLE ANALYSIS AND VALIDATION

5.9.1 Sample Analysis

All analyses of soil samples will be conducted at a contracted laboratory that fulfills all requirements of the D&Z's QA/QC Program and SW 846. The laboratory must follow the scope of work prepared by the project team. A signed certificate of analysis will be provided with each laboratory data package, along with a certificate of compliance certifying that all work was performed in accordance with test methods for evaluating Solid Waste (SW) 846. All analyses will be performed following the highest level of EPA guidance. Analyses will include the proper ratio of field QC samples recommended by EPA guidance for the data quality objectives (DQOs).

This task includes checking the data from the laboratory and converting it into an electronic format that can be readily incorporated into the GIS Data Management system for D&Z.

5.9.2 Field Quality Control Procedures

Quality control duplicate samples and blanks are used to provide a measure of the internal consistency of the samples and to provide an estimate of the components of variance and the bias in the analytical process. The Quality Assurance Project Plans (QAPP) provides details with regard to the number and frequency of field QC samples to be collected during the investigation and are given in Table 3-1.

5.9.2.1 Blanks

Blanks provide a measure of cross-contamination sources, decontamination efficiency, and other potential errors that can be introduced from sources other than the sample. American Society for Testing and Materials (ASTM) Type II water will be used for blanks. Four types of blanks can be generated during sampling activities: trip blanks, field blanks, equipment rinsate blanks, and temperature blanks.

One trip blank will be included in each cooler used for the daily shipment of volatile organic compounds (VOC) samples. If more than one cooler is being sent on a given day, all of the VOC samples should be placed in one cooler, if possible, to minimize the number of trip blanks needed. The trip blanks will be prepared before each sampling event, shipped or transported to the field with the sampling bottles, and

returned unopened for analysis. Trip blanks will indicate if there is contamination during shipment to the field, from storage in the field, or from shipment from the field to the analytical laboratory.

One field blank will be collected per sampling event. If sampling events extend beyond 1 week (5 working days) or for windy and dusty field conditions, the number of field blanks should be increased. Field blanks are used to determine the chemical quality of water used for such procedures as decontamination and blank collection.

One equipment blank per sample medium will be obtained for each day of sampling. Equipment blanks will give an indication of the efficiency of decontamination procedures.

EPA has recently requested that a temperature blank be included in each cooler containing samples for analyses so that the laboratory can record the temperature without disturbing the samples. The temperature blank will be labeled, but will not be given a sample number nor will it be listed as a sample on the chain-of-custody (COC) form.

5.9.2.2 Duplicates

Field duplicate samples will be collected at a frequency of one field duplicate per 10 field samples per matrix. The locations from which the duplicates are taken will be selected randomly. Each duplicate sample will be split evenly into two sample containers and submitted for analysis as two independent samples.

5.9.2.3 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Matrix spike/matrix spike duplicate (MS/MSD) samples will be collected at a frequency of 1 MS/MSD for every 20 field samples collected. Analytical results of these samples indicate the impact of the matrix (water, soil, sediment) on extracting the analyte for analysis. MS/MSD samples give an indication of the laboratory's analytical accuracy and precision within the sample matrix. Data validators will use these results to evaluate the accuracy of the analytical data.

5.9.3 Data Validation

Analytical results will be validated by an independent subcontractor approved by the D&Z. Data validators will mostly use EPA (1999) guidance (Functional Guidelines for Evaluating Data), but other validation guidelines may be used with prior EPA approval.

The hardcopy data packages will be reviewed by the subcontractor chemists using the process outlined in EPA's Functional Guidelines for Evaluating Data (EPA, September 1999). Areas of review will include (when applicable to the method): holding time compliance, calibration verification, blank results, mass spectrometer precision and accuracy, method accuracy as demonstrated by laboratory confirmation samples (LCSs), field duplicate results, surrogate recoveries, internal standard performance, and interference checks. A data review worksheet will be completed for each of these data packages and any non-conformance will be documented. This data review and validation process is independent of the laboratory's checks and focuses on the usability of the data to support the project data interpretation and decision-making processes.

Data that are not within the acceptance limits will be appended with a qualifying flag, which consists of a single or double-letter abbreviation that reflects a problem with the data. The following flags will be used in the evaluation:

- U, undetected. Analyte was analyzed for but not detected above the method detection limit (MDL).
- UJ, detection limit estimated. Analyte was analyzed for, and qualified as not detected. The result is estimated.
- J, estimated. The analyte was present, but the reported value may not be accurate or precise.
- R, rejected. The data are unusable. (Note: Analyte/compound may or may not be present.)

Numerical sample results that are greater than the MDL but less than the laboratory reporting limit (RL) are qualified with a “J” for estimated as required by EPA’s Functional Guidelines (EPA, 1999).

5.10 HEALTH AND SAFETY PROCEDURES

The following section outlines the tasks associated with MEC and environmental investigations, associated hazards and hazard controls that need to be implemented during the completion of the closure plan activities. A detailed Explosives Safety Submission will be prepared prior to initiating any field activities. In addition, a Site Health and Safety Plan will be prepared prior to initiating any field activities.

Personnel performing sampling will use appropriate PPE deemed necessary to accomplish sampling tasks. The PPE to be used will be specified in the closure Health and Safety Plan. Sampling personnel will be properly trained in hazardous waste sampling procedures and will have appropriate medical monitoring and certification. Sampling personnel will also be briefed by the UXO safety officer on the hazards of sampling in a potential explosively contaminated environment. A detailed description of the hazard controls for general hazards (fire hazards, material handling, heat stress, IDW handling, vegetation and insect hazards) will be provided in detail within the Site Health and Safety Plan.

5.10.1 Hazwoper-Regulated Tasks

- Site Layout
- Surface geophysical surveys
 - Magnetic
 - Electromagnetic
- Vegetation removal
- Anomaly reacquisition

5.10.2 Non-Hazwoper-Regulated Tasks

Under specific circumstances, the training and medical monitoring requirements of federal or state Hazwoper regulations are not applicable. It must be demonstrated that the tasks can be performed without the possibility of exposure in order to use non-Hazwoper-trained personnel. Prior approval from the Health and Safety Manager (HSM) is required before these tasks are conducted on regulated hazardous waste sites.

5.11 MEC HAZARD CONTROLS

This section provides safe work practices and control measures used to reduce or eliminate potential hazards. These practices and controls are to be implemented by the party in control of either the site or the particular hazard. Contractors must remain aware of the hazards affecting them regardless of who is responsible for controlling the hazards. The main physical or safety hazards posed to personnel during project activities are described below.

A restricted/EZ shall be established around the area where intrusive activities are conducted. Initially, a 300-foot EZ will be established at each location where intrusive activities are being conducted. If OE/MEC is located during excavation, the EZ will be adjusted to 1,250 feet for non-fragmenting explosive materials; and 2,500 feet for fragmenting explosive materials. While MEC operations are in progress, only those personnel necessary for the operation will be allowed within the EZ. If nonessential personnel enter the area, all MEC operations will cease.

OE includes MEC, OE-contaminated soils and groundwater, range maintenance and ordnance demilitarization (Demil). Sites potentially contaminated with OE/MEC will be screened by the MEC contractor with qualified MEC Technicians prior to and during field activities.

On-site personnel who are potentially exposed to hazards associated with OE activities shall follow the requirements described in this section regardless of the company performing the OE operation.

- Only qualified MEC Technicians or explosive ordnance disposal (EOD) personnel will locate, identify, handle, remove, transport, store, or dispose of OE/MEC items.
- The preferred and safest method for disposal of OE/MEC is to destroy it in its original position by demolition (BIP) whenever circumstances permit. By this method, both the ordnance and the hazard it poses are eliminated in one operation.
- Munitions that have been determined to be “safe to move” by an authorized MEC Technician can be transported to an approved holding area or disposal site.
- One person acting alone should never conduct operations involving contact with OE/MEC.
- OE/MEC must not be moved or disturbed in any way unless it has been determined to be safe to do so by a qualified MEC technician. Operations in the vicinity of OE/MEC should only be conducted after a complete work plan, including emergency procedures, has been established.

- Electronic equipment capable of emitting electromagnetic radiation (such as radios or cellular phones) shall not be activated in the vicinity of known or suspected electrically initiated ordnance.
- Munitions having no color-coding, incomplete color-coding, or improper color-coding are not uncommon, so color coding should not be relied on as a positive identification of ordnance.
- Inhalation of, and skin contact with, smoke, fumes, and vapors of explosives and related hazardous materials shall be avoided.
- OE/MEC that has been exposed to fire or detonation must be considered extremely hazardous. Chemical and physical changes may have occurred to the contents, which render it more sensitive than when in its original state.
- When encountered, attempts should be made to positively identify OE/MEC items. The item shall be carefully examined for markings and other identifying features such as shape, size, and external fittings. The item should not be moved prior to inspection.
- Unnecessary personnel must not remain in the vicinity of OE or MEC.
- Ordnance items must be considered armed and dangerous.
- Fired ammunition or ordnance should not be considered safe.
- MEC items shall not be removed from the site by unauthorized personnel.
- Ordnance items larger than .50 caliber are considered MEC and may contain high explosives.

5.12 APPROACH FOR ESTABLISHING CLEANUP GOALS

The KSAAP RCRA corrective program has established soil and groundwater remediation goals for a limited list of constituents. These goals are shown in Table 5-1. During soil sampling conducted by the U.S. Army Corps of Engineers (USACE) (ARA 2010) several constituents were identified that did not have remediation goals established. For those constituents, if a KDHE RSK value was available, that value would be used. If no RSK value is available, then EPA's RSL value would be used.

TABLE 5-1
SITE-SPECIFIC REMEDIATION GOALS

SOILS		
Contaminant	Non-Residential Soil Clean-Up Target (mg/kg)	Unrestricted Use Clean-Up Target Level (mg/kg)
Trinitrotoluene (TNT)	21	16
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	6	4.4
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	3,300	3,100
Polychlorinated biphenyls	1	0.74
Total Petroleum Hydrocarbons – Diesel Range Organics	2,000	2,000
Total Petroleum Hydrocarbons – Gasoline Range Organics	220	220
Arsenic	16.9 (background in surface soil) 37.8 (background in subsurface soil)	16.9 (background in surface soil) 37.8 (background in subsurface soil)
Cadmium	76	37
Chromium (hexavalent)	64	30
Lead	1000	400
GROUNDWATER		
Contaminant	Groundwater Remediation Goal (µg/L)	
Arsenic	10	
Cadmium	5	
Chromium (total)	100	
Lead	15	
RDX	0.61	
HMX	780	
Tetryl	160	
TNT	2	
1,1-Dichloroethene	7	
Tetrachloroethene	5	
Trichloroethene	5	
Vinyl chloride	2	

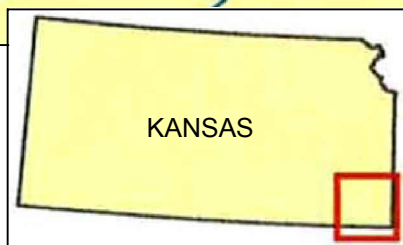
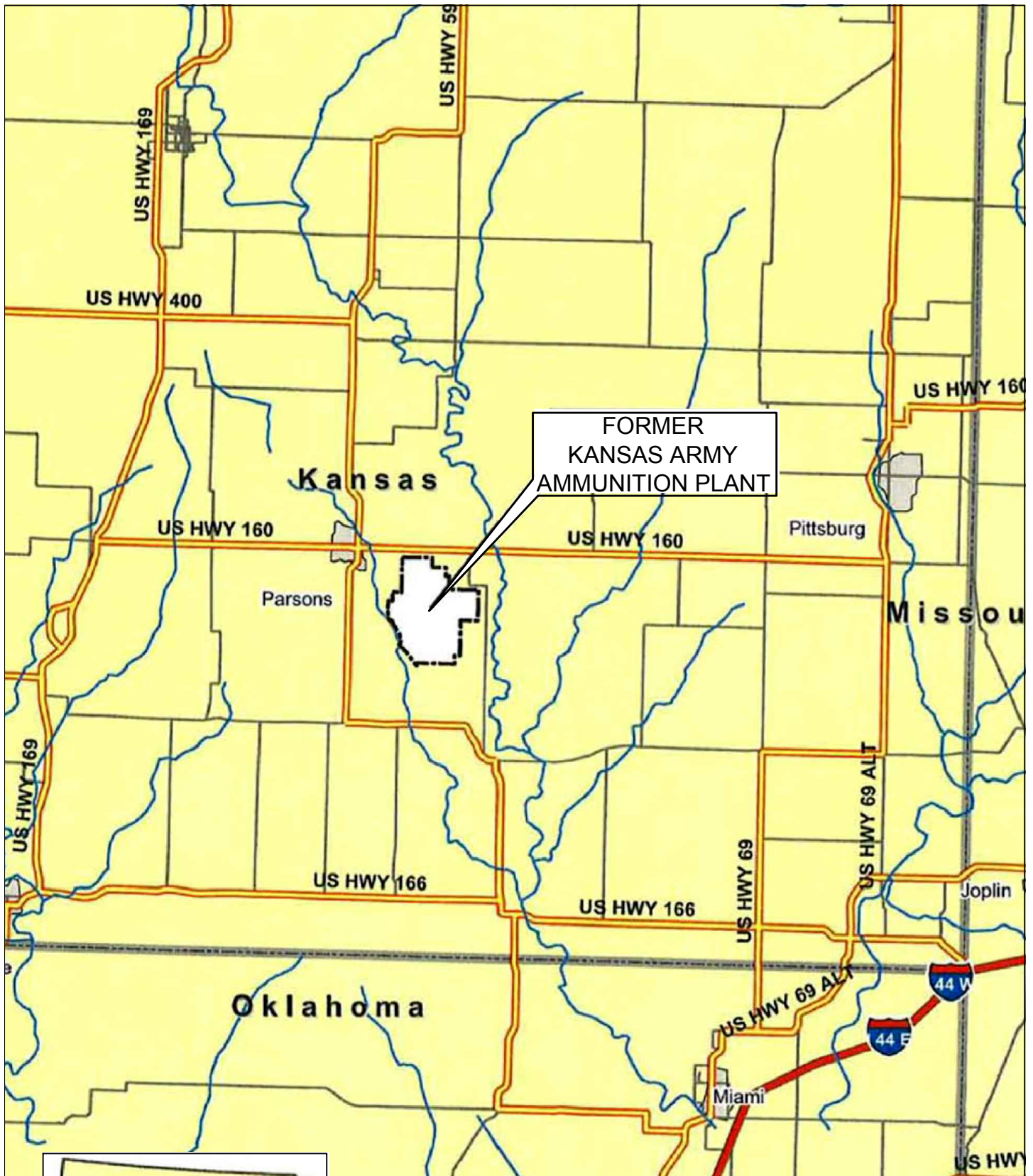
5.13 CLOSURE COST ESTIMATE

The closure cost estimate for the D&Z open detonation grounds prepared in accordance with KAR 28-31-264.142 is attached.

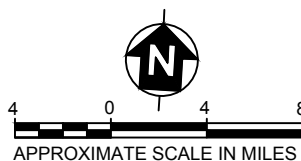
5.14 FINANCIAL ASSURANCE FOR CLOSURE

D&Z has establish financial assurance for closure of the facility, those documents are included in the Section I of the Part B application.

FIGURES



LOCATOR MAP

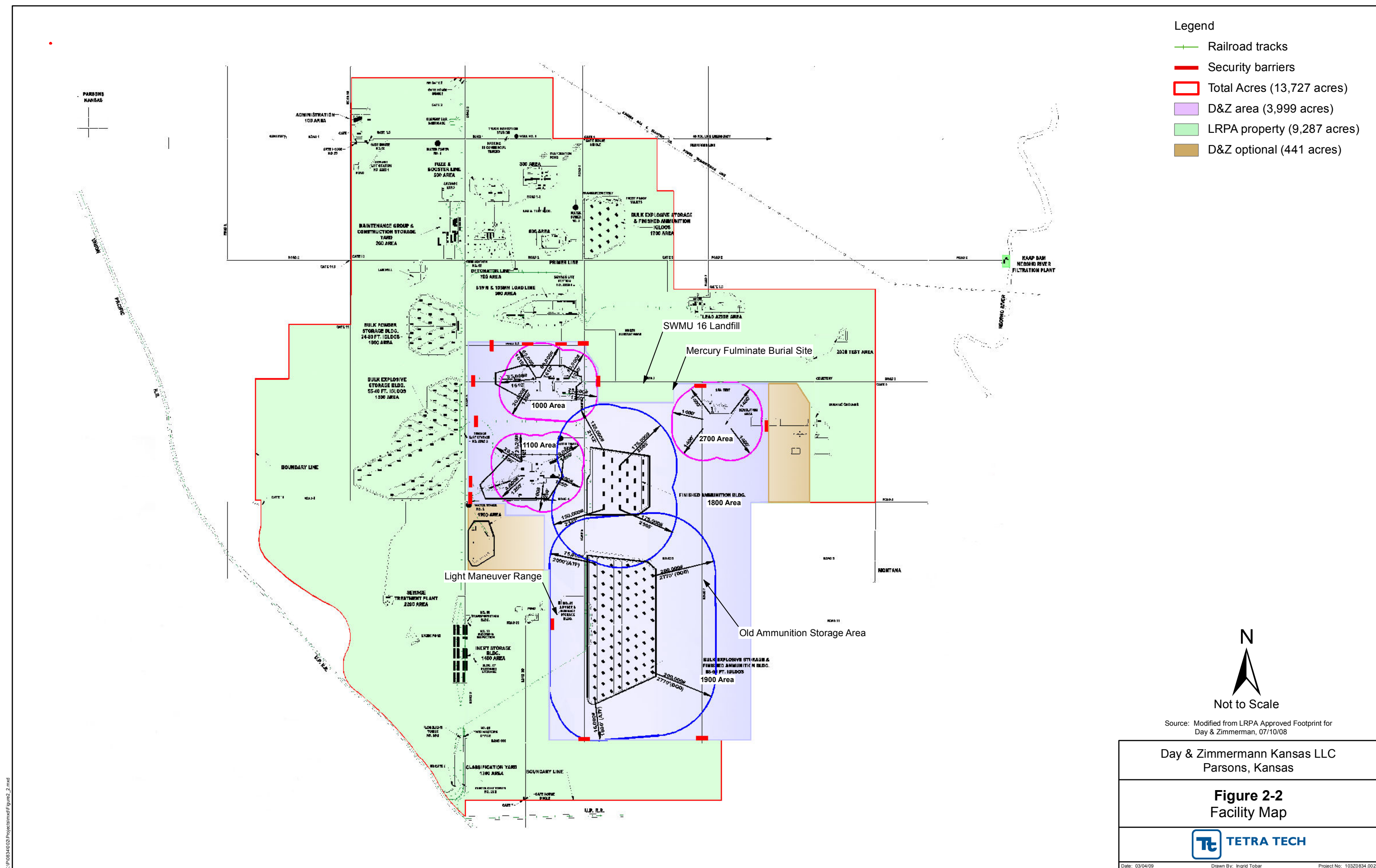


Adapted from: ARA, Inc. 2010

Day & Zimmermann Kansas LLC
Parsons, Kansas

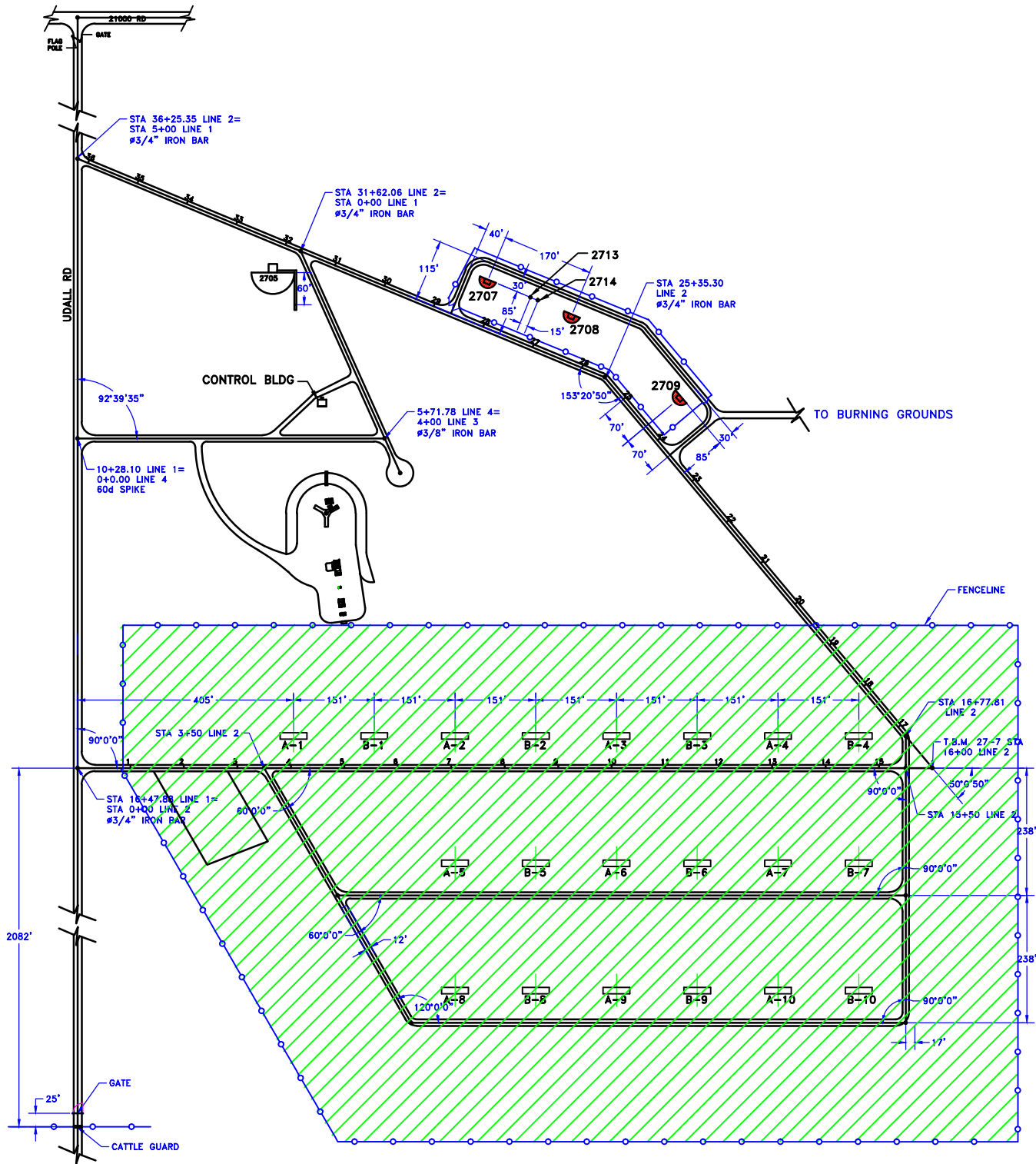
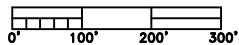
FIGURE 2-1
SITE LOCATION MAP







GRAPHIC SCALE



LEGEND

- HW CONTAINER STORAGE S01
- HW TREATMENT X01
- FENCELINE

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STATE.

SPECIAL NOTES

STAMP MARK OR ETCH PIECE
MARK ON EACH PART.
BREAK ALL SHARP EDGES
UNLESS OTHERWISE NOTED.
APPLICABLE TOLERANCES
UNLESS OTHERWISE NOTED.

COMMON FRACTIONS 1/16
ONE DECIMAL 0.030
TWO DECIMALS 0.015
THREE DECIMALS 0.005
ANGLE 1/4"=1'
SURFACE FINISH



Day & Zimmermann
We do what we say

DAY & ZIMMERMANN KANSAS LLC
KANSAS DIVISION
23102 RUSH ROAD
PARSONS, KANSAS 67357

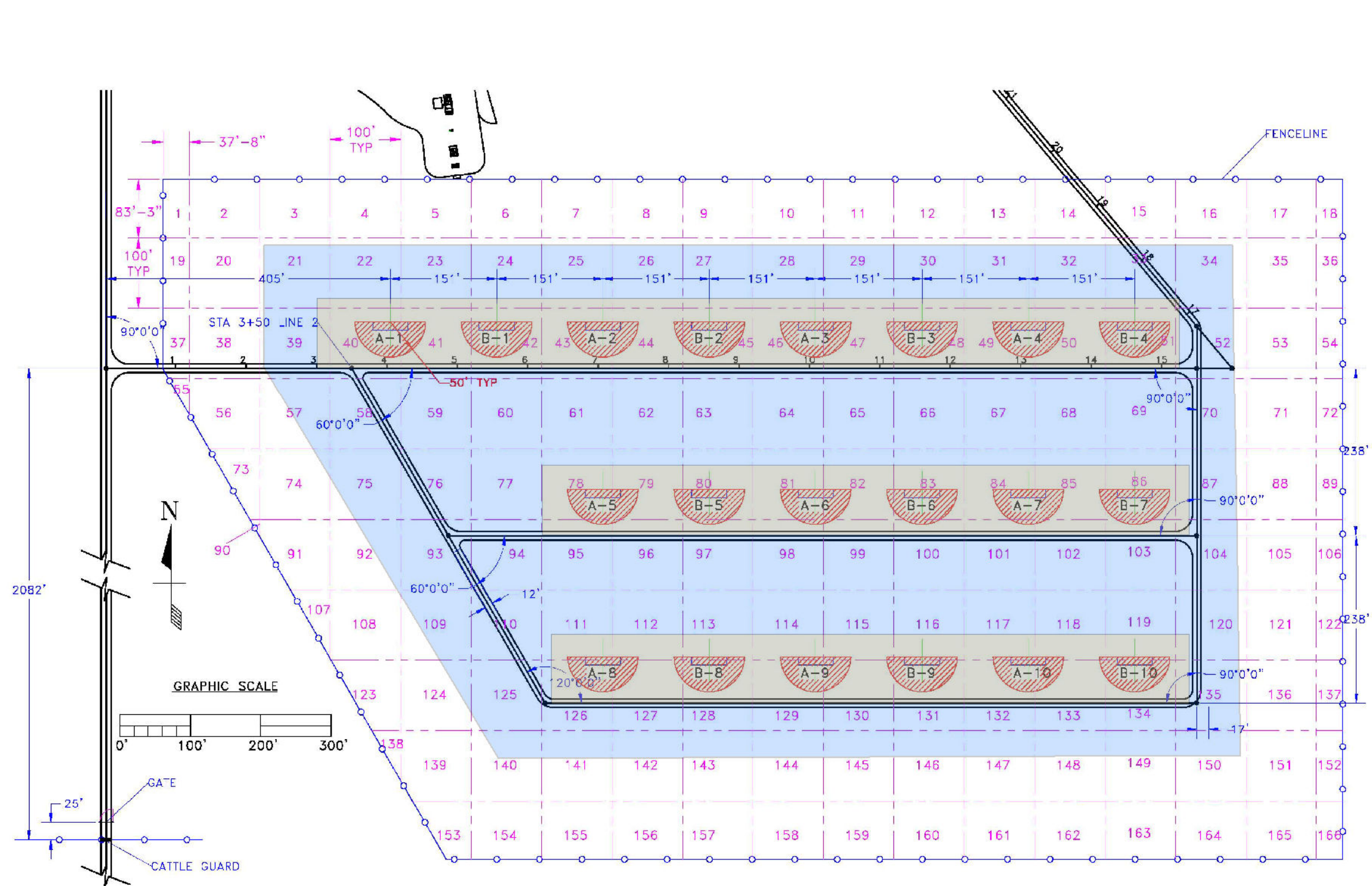
TITLE

D&Z



2700 AREA LAYOUT

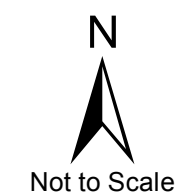
FIGURE 2-3

AREA	SHEET	OF	DRAWING NUMBER	REV
2700	F	3	A-GEN-274	2



Legend

-  Open Detonation (OD) Pit Area
 Area Adjacent to the OD Pits



Source: Modified from Day & Zimmerman, 11/23/09

Day & Zimmermann Kansas LLC
Parsons, Kansas

Figure 3-1
Open Detonation Grounds



Date: 10/10/13 Drawn By: Gustavo Orozco Project No: 103Z0834.002

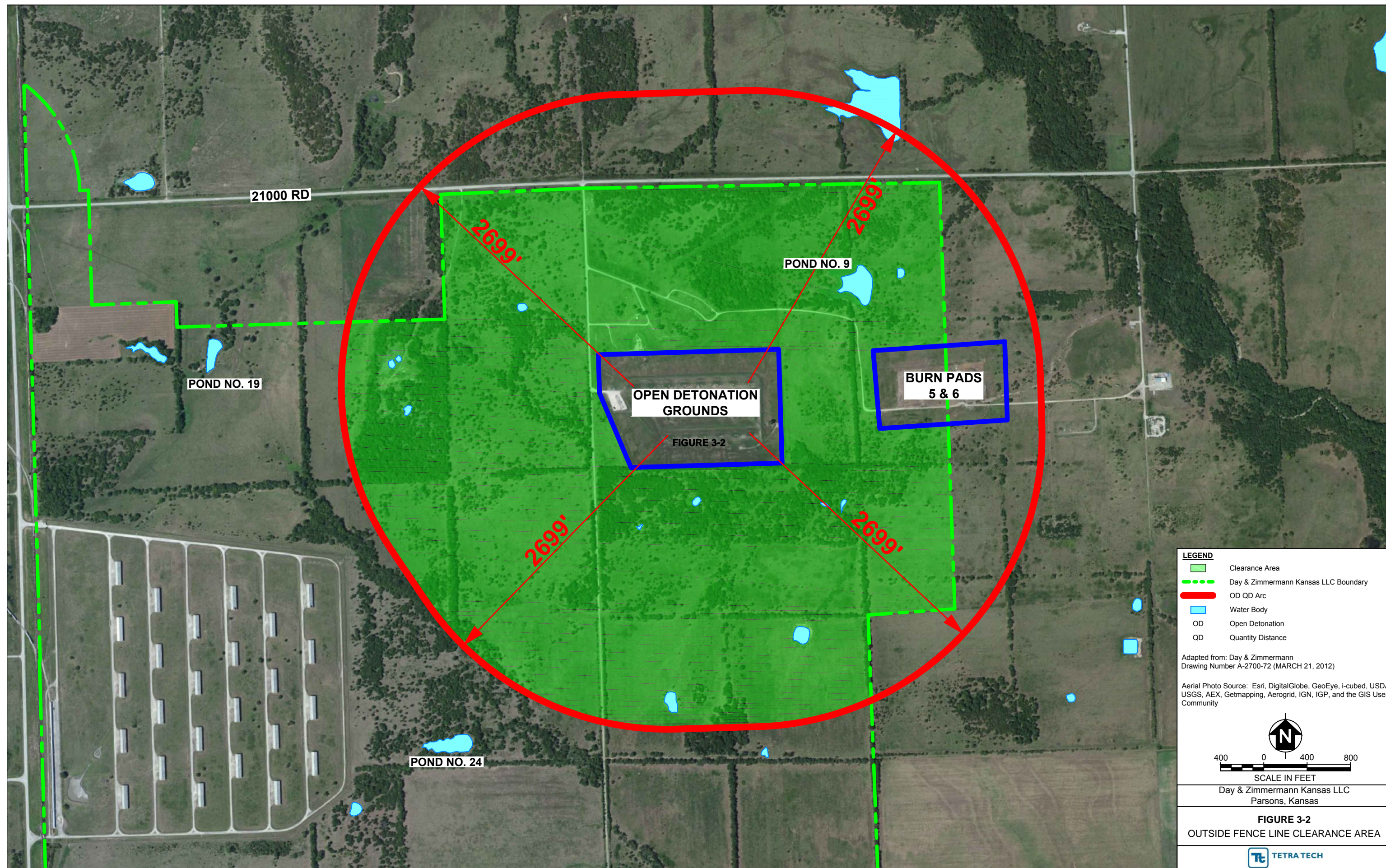
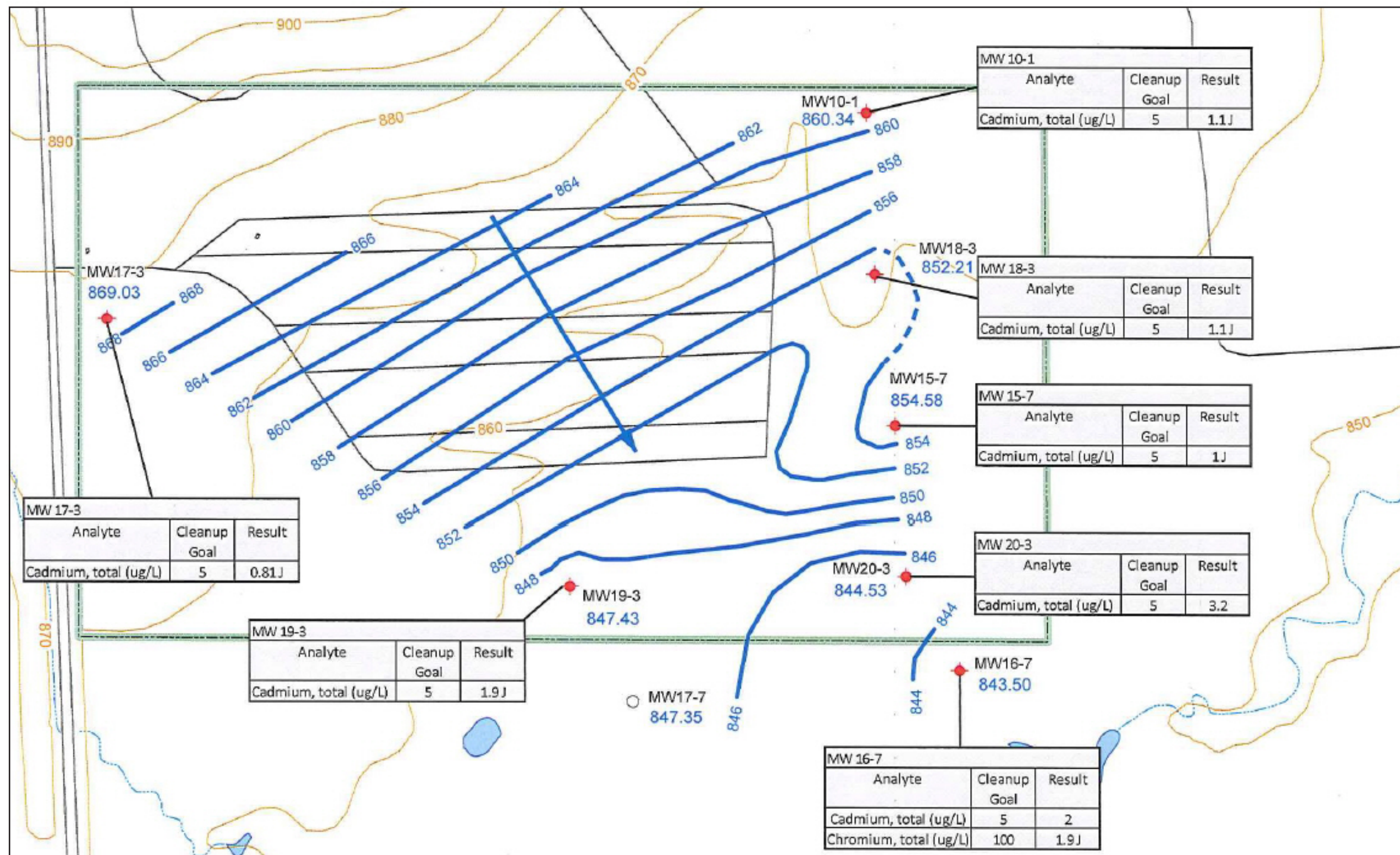


Figure 1-4_Work Plan Clearance Area.dwg - DWH - 08/29/2013



LEGEND



Shallow Groundwater Monitoring Well
Shallow Static Water Level Only
SWL not used for potentiometric surface contouring (999.98)

850 SWMU 17 Potentiometric Surface (Water Levels in feet AMSL) Spring 2012
Groundwater Flow Direction



Not to Scale



Day & Zimmermann

We do what we say.

Day & Zimmermann Kansas LLC
Kansas Division
23102 Rush Road
Parsons, Kansas 67357

SWMU Group 17
Groundwater Monitoring Wells
with 2012 Potentiometric Surface
(Fall 2012)

Figure 3-3

Date: 09/04/13

Drawn By: Nick Wiederholt

Project No: 103P0834.006

CLOSURE COST ESTMATE

Technology Detail Report (with Markups)

System:

RACER Version: 9.1.0
Database Location: S:\PROJECTS\Day & Zimmermann (P0834)\Task Order 004 - Env Remediation
Support\RACER Estimates\RACER_DZI rev 01.mdb

Folder:

Folder Name: KSAAP

Project:

Project ID: KSAAP_ARMY
Project Name: KSAAP_ARMY
Project Category: None

Location

State / Country: KANSAS
City: KANSAS STATE AVERAGE

<u>Location Modifiers</u>	<u>Default</u>	<u>User</u>
Material:	1.01	1.01
Labor:	0.919	0.919
Equipment:	0.989	0.989

Options

Database: System Costs
Cost Database Date: 2007
Report Option: Calendar

Description KSAAP
13

Technology Detail Report (with Markups)

Site:

Site ID: OD Closure Cost Estimate
Site Name: OD Closure Cost Estimate
Site Type: None

Phase Names

Pre-Study: ☐
Study: ☒
Design: ☒
Removal/Interim Action: ☒
Remedial Action: ☒
Operations & Maintenance: ☐
Long Term Monitoring: ☒
Site Closeout: ☒

Documentation

Description: Cost estimate for OD grounds closure.
Support Team: Tetra Tech
References: None

Estimator Information

Estimator Name: Robert Monnig
Estimator Title: Chemical Engineer
Agency/Org./Office: Tetra Tech
Business Address: 415 Oak Street
Kansas City, MO 64114
Telephone Number: 816-412-1775
Email Address: rob.monnig@ttemi.com
Estimate Prepared Date: 10/03/2013

Estimator Signature: _____ **Date:** _____

Technology Detail Report (with Markups)

Reviewer Information

Reviewer Name:

Reviewer Title:

Agency/Org./Office:

Business Address:

Telephone Number:

Email Address:

Date Reviewed:

Reviewer Signature: _____ Date: _____

Technology Detail Report (with Markups)

Phase:

Phase Type: Remedial Action
Phase Name: Open Detonation Area
Description: ..

Media/Waste Type

Primary: Ordnance (not residual)
Secondary: N/A

Contaminant

Primary: Ordnance (not residual)
Secondary: None

Approach: Ordnance Removal
Start Date: January, 2014

Rate Groups

Labor: System Labor Rate
Analysis: System Analysis Rate

Phase Markups: System Defaults

Technology Markups

	<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>
MEC Sifting	Yes	100	0
MEC Removal Action	Yes	100	0
RCRA Facility Investigation	Yes	100	0
RCRA Facility Investigation	Yes	100	0
MEC Site Characterization & Removal Assessment	Yes	100	0
Site Close-Out Documentation	Yes	100	0
Site Close-Out Documentation	Yes	100	0
Site Close-Out Documentation	Yes	100	0
MEC Site Characterization & Removal Assessment	Yes	100	0

Technology Detail Report (with Markups)

Technology:

Name: MEC Site Characterization & Removal Assessment (12 months only)

Prime Markup: 100 %

Sub Markup: 0 %

Element: Site Characterization

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33010202	Per Diem (per person)	630.00	DAY	99.00	0.00	0.00	\$62,370.00	<input checked="" type="checkbox"/>	<input type="checkbox"/>
33021530	Differential GPS Unit Rental	1.00	MO	773.93	0.00	0.00	\$773.93	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33040223	Ordnance Locator, Schoenstedt, Model GA-72CD, weekly rental	40.00	WK	81.91	0.00	0.00	\$3,276.57	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33040646	Backhoe - Rental/Lease	35.00	DAY	0.00	0.00	241.48	\$8,451.74	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33040651	4 X 4 Truck- Rental/Lease	280.00	DAY	0.00	0.00	81.56	\$22,837.68	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33040921	Senior UXO Supervisor (SUXOS)	200.00	HR	0.00	58.82	0.00	\$11,763.20	<input type="checkbox"/>	<input type="checkbox"/>
33040923	UXO Project Manager	200.00	HR	0.00	87.28	0.00	\$17,455.48	<input type="checkbox"/>	<input type="checkbox"/>
33040930	UXO QC Specialist	200.00	HR	0.00	55.49	0.00	\$11,097.84	<input type="checkbox"/>	<input type="checkbox"/>
33040931	UXO Safety Officer	200.00	HR	0.00	55.44	0.00	\$11,088.66	<input type="checkbox"/>	<input type="checkbox"/>
33040934	UXO Technician II	2,400.00	HR	0.00	41.75	0.00	\$100,200.48	<input type="checkbox"/>	<input type="checkbox"/>
33040935	UXO Technician III (UXO Supervisor)	400.00	HR	0.00	49.86	0.00	\$19,942.32	<input type="checkbox"/>	<input type="checkbox"/>
33041001	16oz Standard TNT Booster	740.00	EA	5.50	0.00	0.00	\$4,071.87	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33041002	50 gr/ft Det -Cord (1000 ft roll)	111.00	EA	302.64	0.00	0.00	\$33,593.11	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33041004	12 ft Lead Primadet Non- Electric Detonators	370.00	EA	4.13	0.00	0.00	\$1,526.94	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33041101	Airfare	18.00	LS	750.00	0.00	0.00	\$13,500.00	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Technology Detail Report (with Markups)

Element: Site Characterization

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33240101	Other Direct Costs	1.00	LS	476.32	0.00	0.00	\$476.32	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Total Element Cost							\$322,426.13		
1st Year Technology Cost							\$322,426.13		

Technology Detail Report (with Markups)

System:

RACER Version: 9.1.0
Database Location: S:\PROJECTS\Day & Zimmermann (P0834)\Task Order 004 - Env Remediation
Support\RACER Estimates\RACER_DZI rev 01.mdb

Folder:

Folder Name: KSAAP

Project:

Project ID: KSAAP_ARMY
Project Name: KSAAP_ARMY
Project Category: None

Location

State / Country: KANSAS
City: KANSAS STATE AVERAGE

<u>Location Modifiers</u>	<u>Default</u>	<u>User</u>
Material:	1.01	1.01
Labor:	0.919	0.919
Equipment:	0.989	0.989

Options

Database: System Costs
Cost Database Date: 2007
Report Option: Calendar

Description KSAAP
13

Technology Detail Report (with Markups)

Site:

Site ID: OD Closure Cost Estimate
Site Name: OD Closure Cost Estimate
Site Type: None

Phase Names

Pre-Study: ☐
Study: ☒
Design: ☒
Removal/Interim Action: ☒
Remedial Action: ☒
Operations & Maintenance: ☐
Long Term Monitoring: ☒
Site Closeout: ☒

Documentation

Description: Cost estimate for OD grounds closure.
Support Team: Tetra Tech
References: None

Estimator Information

Estimator Name: Robert Monnig
Estimator Title: Chemical Engineer
Agency/Org./Office: Tetra Tech
Business Address: 415 Oak Street
Kansas City, MO 64114
Telephone Number: 816-412-1775
Email Address: rob.monnig@ttemi.com
Estimate Prepared Date: 10/03/2013

Estimator Signature: _____ **Date:** _____

Technology Detail Report (with Markups)

Reviewer Information

Reviewer Name:

Reviewer Title:

Agency/Org./Office:

Business Address:

Telephone Number:

Email Address:

Date Reviewed:

Reviewer Signature: _____ Date: _____

Technology Detail Report (with Markups)

Phase:

Phase Type: Remedial Action
Phase Name: Open Detonation Area
Description: .

Media/Waste Type

Primary: Ordnance (not residual)
Secondary: N/A

Contaminant

Primary: Ordnance (not residual)
Secondary: None

Approach: Ordnance Removal
Start Date: January, 2014

Rate Groups

Labor: System Labor Rate
Analysis: System Analysis Rate

Phase Markups: System Defaults

Technology Markups

<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>	
MEC Sifting	Yes	100	0
MEC Removal Action	Yes	100	0
RCRA Facility Investigation	Yes	100	0
RCRA Facility Investigation	Yes	100	0
MEC Site Characterization & Removal Assessment	Yes	100	0
Site Close-Out Documentation	Yes	100	0

Technology Detail Report (with Markups)

Technology:

Name: MEC Removal Action (12 months only)

Prime Markup: 100 %

Sub Markup: 0 %

Element: UXO Removal

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33010202	Per Diem (per person)	49.00	DAY	99.00	0.00	0.00	\$4,851.00	<input checked="" type="checkbox"/>	<input type="checkbox"/>
33040223	Ordnance Locator, Schoenstedt, Model GA-72CD, weekly rental	4.00	WK	81.91	0.00	0.00	\$327.66	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33040646	Backhoe - Rental/Lease	7.00	DAY	0.00	0.00	241.48	\$1,690.35	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33040651	4 X 4 Truck- Rental/Lease	14.00	DAY	0.00	0.00	81.56	\$1,141.88	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33040934	UXO Technician II	240.00	HR	0.00	41.75	0.00	\$10,020.05	<input type="checkbox"/>	<input type="checkbox"/>
33040935	UXO Technician III (UXO Supervisor)	40.00	HR	0.00	49.86	0.00	\$1,994.23	<input type="checkbox"/>	<input type="checkbox"/>
33041001	16oz Standard TNT Booster	40.00	EA	5.50	0.00	0.00	\$220.10	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33041002	50 gr/ft Det -Cord (1000 ft roll)	6.00	EA	302.64	0.00	0.00	\$1,815.84	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33041004	12 ft Lead Primadet Non- Electric Detonators	20.00	EA	4.13	0.00	0.00	\$82.54	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33240101	Other Direct Costs	1.00	LS	1,036.01	0.00	0.00	\$1,036.01	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Total Element Cost							\$23,179.66		
1st Year Technology Cost							\$23,179.66		

Technology Detail Report (with Markups)

System:

RACER Version: 9.1.0
Database Location: S:\PROJECTS\Day & Zimmermann (P0834)\Task Order 004 - Env Remediation
Support\RACER Estimates\RACER_DZI rev 01.mdb

Folder:

Folder Name: KSAAP

Project:

Project ID: KSAAP_ARMY
Project Name: KSAAP_ARMY
Project Category: None

Location

State / Country: KANSAS
City: KANSAS STATE AVERAGE

<u>Location Modifiers</u>	<u>Default</u>	<u>User</u>
Material:	1.01	1.01
Labor:	0.919	0.919
Equipment:	0.989	0.989

Options

Database: System Costs
Cost Database Date: 2007
Report Option: Calendar

Description KSAAP
13

Technology Detail Report (with Markups)

Site:

Site ID: OD Closure Cost Estimate
Site Name: OD Closure Cost Estimate
Site Type: None

Phase Names

Pre-Study: ☐
Study: ☒
Design: ☒
Removal/Interim Action: ☒
Remedial Action: ☒
Operations & Maintenance: ☐
Long Term Monitoring: ☒
Site Closeout: ☒

Documentation

Description: Cost estimate for OD grounds closure.
Support Team: Tetra Tech
References: None

Estimator Information

Estimator Name: Robert Monnig
Estimator Title: Chemical Engineer
Agency/Org./Office: Tetra Tech
Business Address: 415 Oak Street
Kansas City, MO 64114
Telephone Number: 816-412-1775
Email Address: rob.monnig@ttemi.com
Estimate Prepared Date: 10/03/2013

Estimator Signature: _____ **Date:** _____

Technology Detail Report (with Markups)

Reviewer Information

Reviewer Name:

Reviewer Title:

Agency/Org./Office:

Business Address:

Telephone Number:

Email Address:

Date Reviewed:

Reviewer Signature: _____ Date: _____

Technology Detail Report (with Markups)

Phase:

Phase Type: Remedial Action
Phase Name: Open Detonation Area
Description: .

Media/Waste Type

Primary: Ordnance (not residual)
Secondary: N/A

Contaminant

Primary: Ordnance (not residual)
Secondary: None

Approach: Ordnance Removal
Start Date: January, 2014

Rate Groups

Labor: System Labor Rate
Analysis: System Analysis Rate

Phase Markups: System Defaults

Technology Markups

	<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>
MEC Sifting	Yes	100	0
MEC Removal Action	Yes	100	0
RCRA Facility Investigation	Yes	100	0
RCRA Facility Investigation	Yes	100	0
MEC Site Characterization & Removal Assessment	Yes	100	0
Site Close-Out Documentation	Yes	100	0

Technology Detail Report (with Markups)

Technology:

Name: MEC Sifting (12 months only)

Prime Markup: 100 %

Sub Markup: 0 %

Element: Site Management

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33010202	Per Diem (per person)	371.00	DAY	99.00	0.00	0.00	\$36,729.00	<input checked="" type="checkbox"/>	<input type="checkbox"/>
33040921	Senior UXO Supervisor (SUXOS)	530.00	HR	0.00	58.82	0.00	\$31,172.48	<input type="checkbox"/>	<input type="checkbox"/>
33040923	UXO Project Manager	530.00	HR	0.00	87.28	0.00	\$46,257.02	<input type="checkbox"/>	<input type="checkbox"/>
33040930	UXO QC Specialist	530.00	HR	0.00	55.49	0.00	\$29,409.28	<input type="checkbox"/>	<input type="checkbox"/>
33040931	UXO Safety Officer	530.00	HR	0.00	55.44	0.00	\$29,384.95	<input type="checkbox"/>	<input type="checkbox"/>
Total Element Cost							\$172,952.73		
1st Year Technology Cost							\$172,952.73		

Technology Detail Report (with Markups)

System:

RACER Version: 9.1.0
Database Location: S:\PROJECTS\Day & Zimmermann (P0834)\Task Order 004 - Env Remediation
Support\RACER Estimates\RACER_DZI rev 01.mdb

Folder:

Folder Name: KSAAP

Project:

Project ID: KSAAP_ARMY
Project Name: KSAAP_ARMY
Project Category: None

Location

State / Country: KANSAS
City: KANSAS STATE AVERAGE

<u>Location Modifiers</u>	<u>Default</u>	<u>User</u>
Material:	1.01	1.01
Labor:	0.919	0.919
Equipment:	0.989	0.989

Options

Database: System Costs
Cost Database Date: 2007
Report Option: Calendar

Description KSAAP
13

Technology Detail Report (with Markups)

Site:

Site ID: OD Closure Cost Estimate
Site Name: OD Closure Cost Estimate
Site Type: None

Phase Names

Pre-Study: ☐
Study: ☒
Design: ☒
Removal/Interim Action: ☒
Remedial Action: ☒
Operations & Maintenance: ☐
Long Term Monitoring: ☒
Site Closeout: ☒

Documentation

Description: Cost estimate for OD grounds closure.
Support Team: Tetra Tech
References: None

Estimator Information

Estimator Name: Robert Monnig
Estimator Title: Chemical Engineer
Agency/Org./Office: Tetra Tech
Business Address: 415 Oak Street
Kansas City, MO 64114
Telephone Number: 816-412-1775
Email Address: rob.monnig@ttemi.com
Estimate Prepared Date: 10/03/2013

Estimator Signature: _____ **Date:** _____

Technology Detail Report (with Markups)

Reviewer Information

Reviewer Name:

Reviewer Title:

Agency/Org./Office:

Business Address:

Telephone Number:

Email Address:

Date Reviewed:

Reviewer Signature: _____ Date: _____

Technology Detail Report (with Markups)

Phase:

Phase Type: Remedial Action
Phase Name: Open Detonation Area
Description: .

Media/Waste Type

Primary: Ordnance (not residual)
Secondary: N/A

Contaminant

Primary: Ordnance (not residual)
Secondary: None

Approach: Ordnance Removal
Start Date: January, 2014

Rate Groups

Labor: System Labor Rate
Analysis: System Analysis Rate

Phase Markups: System Defaults

Technology Markups

<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>	
MEC Sifting	Yes	100	0
MEC Removal Action	Yes	100	0
RCRA Facility Investigation	Yes	100	0
RCRA Facility Investigation	Yes	100	0
MEC Site Characterization & Removal Assessment	Yes	100	0
Site Close-Out Documentation	Yes	100	0

Technology Detail Report (with Markups)

Technology:

Name: MEC Removal Action (12 months only)

Prime Markup: 100 %

Sub Markup: 0 %

Element: Stakeholder Involvement

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33040923	UXO Project Manager	12.00	HR	0.00	87.28	0.00	\$1,047.33	<input type="checkbox"/>	<input type="checkbox"/>
33040935	UXO Technician III (UXO Supervisor)	12.00	HR	0.00	49.86	0.00	\$598.27	<input type="checkbox"/>	<input type="checkbox"/>
33041305	Explosive Safety Submission (Moderate Complexity)	1.00	EA	0.00	10,844.72	0.00	\$10,844.72	<input type="checkbox"/>	<input type="checkbox"/>
33041314	UXO Removal Report (Moderate Complexity)	1.00	EA	0.00	26,582.19	0.00	\$26,582.19	<input type="checkbox"/>	<input type="checkbox"/>
Total Element Cost							\$39,072.50		
1st Year Technology Cost							\$39,072.50		

Technology Detail Report (with Markups)

System:

RACER Version: 9.1.0
Database Location: S:\PROJECTS\Day & Zimmermann (P0834)\Task Order 004 - Env Remediation
Support\RACER Estimates\RACER_DZI rev 01.mdb

Folder:

Folder Name: KSAAP

Project:

Project ID: KSAAP_ARMY
Project Name: KSAAP_ARMY
Project Category: None

Location

State / Country: KANSAS
City: KANSAS STATE AVERAGE

<u>Location Modifiers</u>	<u>Default</u>	<u>User</u>
Material:	1.01	1.01
Labor:	0.919	0.919
Equipment:	0.989	0.989

Options

Database: System Costs
Cost Database Date: 2007
Report Option: Calendar

Description KSAAP
13

Technology Detail Report (with Markups)

Site:

Site ID: OD Closure Cost Estimate
Site Name: OD Closure Cost Estimate
Site Type: None

Phase Names

Pre-Study: ☐
Study: ☒
Design: ☒
Removal/Interim Action: ☒
Remedial Action: ☒
Operations & Maintenance: ☐
Long Term Monitoring: ☒
Site Closeout: ☒

Documentation

Description: Cost estimate for OD grounds closure.
Support Team: Tetra Tech
References: None

Estimator Information

Estimator Name: Robert Monnig
Estimator Title: Chemical Engineer
Agency/Org./Office: Tetra Tech
Business Address: 415 Oak Street
Kansas City, MO 64114
Telephone Number: 816-412-1775
Email Address: rob.monnig@ttemi.com
Estimate Prepared Date: 10/03/2013

Estimator Signature: _____ **Date:** _____

Technology Detail Report (with Markups)

Reviewer Information

Reviewer Name:

Reviewer Title:

Agency/Org./Office:

Business Address:

Telephone Number:

Email Address:

Date Reviewed:

Reviewer Signature: _____ Date: _____

Technology Detail Report (with Markups)

Phase:

Phase Type: Remedial Action
Phase Name: Open Detonation Area
Description: .

Media/Waste Type

Primary: Ordnance (not residual)
Secondary: N/A

Contaminant

Primary: Ordnance (not residual)
Secondary: None

Approach: Ordnance Removal
Start Date: January, 2014

Rate Groups

Labor: System Labor Rate
Analysis: System Analysis Rate

Phase Markups: System Defaults

Technology Markups

	<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>
MEC Sifting	Yes	100	0
MEC Removal Action	Yes	100	0
RCRA Facility Investigation	Yes	100	0
RCRA Facility Investigation	Yes	100	0
MEC Site Characterization & Removal Assessment	Yes	100	0
Site Close-Out Documentation	Yes	100	0

Technology Detail Report (with Markups)

Technology:

Name: RCRA Facility Investigation (12 months only)

Templates: DZI - Soil - Explosives, metals, perchlorate

Prime Markup: 100 %

Sub Markup: 0 %

Element: Sampling and Analysis

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33010104	Sample collection, vehicle mileage charge, car or van	690.00	MI	0.45	0.00	0.00	\$307.05	<input checked="" type="checkbox"/>	<input type="checkbox"/>
33010202	Per Diem (per person)	50.00	DAY	99.00	0.00	0.00	\$4,950.00	<input checked="" type="checkbox"/>	<input type="checkbox"/>
33020343	Photo-Ionization Detector, HnU, Weekly Rental	5.00	WK	240.54	0.00	0.00	\$1,202.71	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33020401	Disposable Materials per Sample	500.00	EA	11.07	0.00	0.00	\$5,536.90	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33020402	Decontamination Materials per Sample	500.00	EA	10.16	0.00	0.00	\$5,078.99	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33020605	Screw augers, hand auger rental	25.00	DAY	75.41	0.00	0.00	\$1,885.33	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33220109	Staff Scientist	200.00	HR	0.00	93.25	0.00	\$18,649.89	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33220112	Field Technician	200.00	HR	0.00	71.87	0.00	\$14,373.10	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Total Element Cost							\$51,983.97		
1st Year Technology Cost							\$51,983.97		

Technology Detail Report (with Markups)

System:

RACER Version: 9.1.0
Database Location: S:\PROJECTS\Day & Zimmermann (P0834)\Task Order 004 - Env Remediation
Support\RACER Estimates\RACER_DZI rev 01.mdb

Folder:

Folder Name: KSAAP

Project:

Project ID: KSAAP_ARMY
Project Name: KSAAP_ARMY
Project Category: None

Location

State / Country: KANSAS
City: KANSAS STATE AVERAGE

<u>Location Modifiers</u>	<u>Default</u>	<u>User</u>
Material:	1.01	1.01
Labor:	0.919	0.919
Equipment:	0.989	0.989

Options

Database: System Costs
Cost Database Date: 2007
Report Option: Calendar

Description KSAAP
13

Technology Detail Report (with Markups)

Site:

Site ID: OD Closure Cost Estimate
Site Name: OD Closure Cost Estimate
Site Type: None

Phase Names

Pre-Study: ☐
Study: ☒
Design: ☒
Removal/Interim Action: ☒
Remedial Action: ☒
Operations & Maintenance: ☐
Long Term Monitoring: ☒
Site Closeout: ☒

Documentation

Description: Cost estimate for OD grounds closure.
Support Team: Tetra Tech
References: None

Estimator Information

Estimator Name: Robert Monnig
Estimator Title: Chemical Engineer
Agency/Org./Office: Tetra Tech
Business Address: 415 Oak Street
Kansas City, MO 64114
Telephone Number: 816-412-1775
Email Address: rob.monnig@ttemi.com
Estimate Prepared Date: 10/03/2013

Estimator Signature: _____ **Date:** _____

Technology Detail Report (with Markups)

Reviewer Information

Reviewer Name:

Reviewer Title:

Agency/Org./Office:

Business Address:

Telephone Number:

Email Address:

Date Reviewed:

Reviewer Signature: _____ Date: _____

Technology Detail Report (with Markups)

Phase:

Phase Type: Remedial Action
Phase Name: Open Detonation Area
Description: .

Media/Waste Type

Primary: Ordnance (not residual)
Secondary: N/A

Contaminant

Primary: Ordnance (not residual)
Secondary: None

Approach: Ordnance Removal
Start Date: January, 2014

Rate Groups

Labor: System Labor Rate
Analysis: System Analysis Rate

Phase Markups: System Defaults

Technology Markups

<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>	
MEC Sifting	Yes	100	0
MEC Removal Action	Yes	100	0
RCRA Facility Investigation	Yes	100	0
RCRA Facility Investigation	Yes	100	0
MEC Site Characterization & Removal Assessment	Yes	100	0
Site Close-Out Documentation	Yes	100	0

Technology Detail Report (with Markups)

Technology:

Name: Site Close-Out Documentation (12 months only)

Prime Markup: 100 %

Sub Markup: 0 %

Element: Work Plans & Reports

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33220101	Senior Project Manager	4.00	HR	0.00	184.94	0.00	\$739.77	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33220102	Project Manager	40.00	HR	0.00	149.96	0.00	\$5,998.27	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33220109	Staff Scientist	80.00	HR	0.00	93.25	0.00	\$7,459.96	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33220114	Word Processing/Clerical	8.00	HR	0.00	64.96	0.00	\$519.70	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33220115	Draftsman/CADD	80.00	HR	0.00	77.82	0.00	\$6,225.64	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Total Element Cost							\$20,943.34		
1st Year Technology Cost							\$20,943.34		

Technology Detail Report (with Markups)

System:

RACER Version: 9.1.0
Database Location: S:\PROJECTS\Day & Zimmermann (P0834)\Task Order 004 - Env Remediation
Support\RACER Estimates\RACER_DZI rev 01.mdb

Folder:

Folder Name: KSAAP

Project:

Project ID: KSAAP_ARMY
Project Name: KSAAP_ARMY
Project Category: None

Location

State / Country: KANSAS
City: KANSAS STATE AVERAGE

<u>Location Modifiers</u>	<u>Default</u>	<u>User</u>
Material:	1.01	1.01
Labor:	0.919	0.919
Equipment:	0.989	0.989

Options

Database: System Costs
Cost Database Date: 2007
Report Option: Calendar

Description KSAAP
13

Technology Detail Report (with Markups)

Site:

Site ID: OD Closure Cost Estimate
Site Name: OD Closure Cost Estimate
Site Type: None

Phase Names

Pre-Study: ☐
Study: ☒
Design: ☒
Removal/Interim Action: ☒
Remedial Action: ☒
Operations & Maintenance: ☐
Long Term Monitoring: ☒
Site Closeout: ☒

Documentation

Description: Cost estimate for OD grounds closure.
Support Team: Tetra Tech
References: None

Estimator Information

Estimator Name: Robert Monnig
Estimator Title: Chemical Engineer
Agency/Org./Office: Tetra Tech
Business Address: 415 Oak Street
Kansas City, MO 64114
Telephone Number: 816-412-1775
Email Address: rob.monnig@ttemi.com
Estimate Prepared Date: 10/03/2013

Estimator Signature: _____ **Date:** _____

Technology Detail Report (with Markups)

Reviewer Information

Reviewer Name:

Reviewer Title:

Agency/Org./Office:

Business Address:

Telephone Number:

Email Address:

Date Reviewed:

Reviewer Signature: _____ Date: _____

Technology Detail Report (with Markups)

Phase:

Phase Type: Remedial Action
Phase Name: Open Detonation Area
Description: ..

Media/Waste Type

Primary: Ordnance (not residual)
Secondary: N/A

Contaminant

Primary: Ordnance (not residual)
Secondary: None

Approach: Ordnance Removal
Start Date: January, 2014

Rate Groups

Labor: System Labor Rate
Analysis: System Analysis Rate

Phase Markups: System Defaults

Technology Markups

	<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>
MEC Sifting	Yes	100	0
MEC Removal Action	Yes	100	0
RCRA Facility Investigation	Yes	100	0
RCRA Facility Investigation	Yes	100	0
MEC Site Characterization & Removal Assessment	Yes	100	0
Site Close-Out Documentation	Yes	100	0
Site Close-Out Documentation	Yes	100	0

Technology Detail Report (with Markups)

Technology:

Name: Site Close-Out Documentation (12 months only)

Prime Markup: 100 %

Sub Markup: 0 %

Element: Work Plans & Reports

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33220101	Senior Project Manager	4.00	HR	0.00	184.94	0.00	\$739.77	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33220102	Project Manager	60.00	HR	0.00	149.96	0.00	\$8,997.41	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33220109	Staff Scientist	120.00	HR	0.00	93.25	0.00	\$11,189.93	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33220114	Word Processing/Clerical	24.00	HR	0.00	64.96	0.00	\$1,559.11	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33220115	Draftsman/CADD	80.00	HR	0.00	77.82	0.00	\$6,225.64	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Total Element Cost							\$28,711.86		
1st Year Technology Cost							\$28,711.86		

Technology Detail Report (with Markups)

System:

RACER Version: 9.1.0
Database Location: S:\PROJECTS\Day & Zimmermann (P0834)\Task Order 004 - Env Remediation
Support\RACER Estimates\RACER_DZI rev 01.mdb

Folder:

Folder Name: KSAAP

Project:

Project ID: KSAAP_ARMY
Project Name: KSAAP_ARMY
Project Category: None

Location

State / Country: KANSAS
City: KANSAS STATE AVERAGE

<u>Location Modifiers</u>	<u>Default</u>	<u>User</u>
Material:	1.01	1.01
Labor:	0.919	0.919
Equipment:	0.989	0.989

Options

Database: System Costs
Cost Database Date: 2007
Report Option: Calendar

Description KSAAP
13

Technology Detail Report (with Markups)

Site:

Site ID: OD Closure Cost Estimate
Site Name: OD Closure Cost Estimate
Site Type: None

Phase Names

Pre-Study: ☐
Study: ☒
Design: ☒
Removal/Interim Action: ☒
Remedial Action: ☒
Operations & Maintenance: ☐
Long Term Monitoring: ☒
Site Closeout: ☒

Documentation

Description: Cost estimate for OD grounds closure.
Support Team: Tetra Tech
References: None

Estimator Information

Estimator Name: Robert Monnig
Estimator Title: Chemical Engineer
Agency/Org./Office: Tetra Tech
Business Address: 415 Oak Street
Kansas City, MO 64114
Telephone Number: 816-412-1775
Email Address: rob.monnig@ttemi.com
Estimate Prepared Date: 10/03/2013

Estimator Signature: _____ **Date:** _____

Technology Detail Report (with Markups)

Reviewer Information

Reviewer Name:

Reviewer Title:

Agency/Org./Office:

Business Address:

Telephone Number:

Email Address:

Date Reviewed:

Reviewer Signature: _____ Date: _____

Technology Detail Report (with Markups)

Phase:

Phase Type: Remedial Action
Phase Name: Open Detonation Area
Description: ..

Media/Waste Type

Primary: Ordnance (not residual)
Secondary: N/A

Contaminant

Primary: Ordnance (not residual)
Secondary: None

Approach: Ordnance Removal
Start Date: January, 2014

Rate Groups

Labor: System Labor Rate
Analysis: System Analysis Rate

Phase Markups: System Defaults

Technology Markups

	<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>
MEC Sifting	Yes	100	0
MEC Removal Action	Yes	100	0
RCRA Facility Investigation	Yes	100	0
RCRA Facility Investigation	Yes	100	0
MEC Site Characterization & Removal Assessment	Yes	100	0
Site Close-Out Documentation	Yes	100	0
Site Close-Out Documentation	Yes	100	0
Site Close-Out Documentation	Yes	100	0

Technology Detail Report (with Markups)

Technology:

Name: Site Close-Out Documentation (12 months only)

Prime Markup: 100 %

Sub Markup: 0 %

Element: Work Plans & Reports

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33220101	Senior Project Manager	4.00	HR	0.00	184.94	0.00	\$739.77	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33220102	Project Manager	60.00	HR	0.00	149.96	0.00	\$8,997.41	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33220109	Staff Scientist	80.00	HR	0.00	93.25	0.00	\$7,459.96	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33220114	Word Processing/Clerical	16.00	HR	0.00	64.96	0.00	\$1,039.41	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33220115	Draftsman/CADD	40.00	HR	0.00	77.82	0.00	\$3,112.82	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Total Element Cost							\$21,349.36		
1st Year Technology Cost							\$21,349.36		

Technology Detail Report (with Markups)

System:

RACER Version: 9.1.0
Database Location: S:\PROJECTS\Day & Zimmermann (P0834)\Task Order 004 - Env Remediation
Support\RACER Estimates\RACER_DZI rev 01.mdb

Folder:

Folder Name: KSAAP

Project:

Project ID: KSAAP_ARMY
Project Name: KSAAP_ARMY
Project Category: None

Location

State / Country: KANSAS
City: KANSAS STATE AVERAGE

<u>Location Modifiers</u>	<u>Default</u>	<u>User</u>
Material:	1.01	1.01
Labor:	0.919	0.919
Equipment:	0.989	0.989

Options

Database: System Costs
Cost Database Date: 2007
Report Option: Calendar

Description KSAAP
13

Technology Detail Report (with Markups)

Site:

Site ID: OD Closure Cost Estimate
Site Name: OD Closure Cost Estimate
Site Type: None

Phase Names

Pre-Study: ☐
Study: ☒
Design: ☒
Removal/Interim Action: ☒
Remedial Action: ☒
Operations & Maintenance: ☐
Long Term Monitoring: ☒
Site Closeout: ☒

Documentation

Description: Cost estimate for OD grounds closure.
Support Team: Tetra Tech
References: None

Estimator Information

Estimator Name: Robert Monnig
Estimator Title: Chemical Engineer
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Business Address: 415 Oak Street
Kansas City, MO 64114
Telephone Number: 816-412-1775
Email Address: rob.monnig@ttemi.com
Estimate Prepared Date: 10/03/2013

Estimator Signature: _____ **Date:** _____

Technology Detail Report (with Markups)

Reviewer Information

Reviewer Name:

Reviewer Title:

Agency/Org./Office:

Business Address:

Telephone Number:

Email Address:

Date Reviewed:

Reviewer Signature: _____ Date: _____

Technology Detail Report (with Markups)

Phase:

Phase Type: Remedial Action
Phase Name: Open Detonation Area
Description: ..

Media/Waste Type

Primary: Ordnance (not residual)
Secondary: N/A

Contaminant

Primary: Ordnance (not residual)
Secondary: None

Approach: Ordnance Removal
Start Date: January, 2014

Rate Groups

Labor: System Labor Rate
Analysis: System Analysis Rate

Phase Markups: System Defaults

Technology Markups

<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>	
MEC Sifting	Yes	100	0
MEC Removal Action	Yes	100	0
RCRA Facility Investigation	Yes	100	0
RCRA Facility Investigation	Yes	100	0
MEC Site Characterization & Removal Assessment	Yes	100	0
Site Close-Out Documentation	Yes	100	0
Site Close-Out Documentation	Yes	100	0
Site Close-Out Documentation	Yes	100	0

Technology Detail Report (with Markups)

Technology:

Name: MEC Site Characterization & Removal Assessment (12 months only)

Prime Markup: 100 %

Sub Markup: 0 %

Element: Site Planning

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
17010401	Chipping brush, light brush	19.00	ACR	0.00	1,074.34	450.67	\$28,975.23	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33010108	Sedan, Automobile, Rental	12.00	DAY	63.06	0.00	0.00	\$756.76	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33010202	Per Diem (per person)	34.00	DAY	99.00	0.00	0.00	\$3,366.00	<input checked="" type="checkbox"/>	<input type="checkbox"/>
33040921	Senior UXO Supervisor (SUXOS)	50.00	HR	0.00	58.82	0.00	\$2,940.80	<input type="checkbox"/>	<input type="checkbox"/>
33040923	UXO Project Manager	126.00	HR	0.00	87.28	0.00	\$10,996.95	<input type="checkbox"/>	<input type="checkbox"/>
33040925	UXO Staff Engineer	16.00	HR	0.00	65.73	0.00	\$1,051.63	<input type="checkbox"/>	<input type="checkbox"/>
33040926	UXO Junior Engineer	208.00	HR	0.00	49.72	0.00	\$10,341.32	<input type="checkbox"/>	<input type="checkbox"/>
33040929	UXO Word Processor	8.00	HR	0.00	30.74	0.00	\$245.92	<input type="checkbox"/>	<input type="checkbox"/>
33040930	UXO QC Specialist	50.00	HR	0.00	55.49	0.00	\$2,774.46	<input type="checkbox"/>	<input type="checkbox"/>
33040931	UXO Safety Officer	98.00	HR	0.00	55.44	0.00	\$5,433.44	<input type="checkbox"/>	<input type="checkbox"/>
33040935	UXO Technician III (UXO Supervisor)	90.00	HR	0.00	49.86	0.00	\$4,487.02	<input type="checkbox"/>	<input type="checkbox"/>
33040936	Geophysicist (UXO)	152.00	HR	0.00	88.26	0.00	\$13,415.64	<input type="checkbox"/>	<input type="checkbox"/>
33040938	Geologist (UXO)	48.00	HR	0.00	62.46	0.00	\$2,998.29	<input type="checkbox"/>	<input type="checkbox"/>
33040939	UXO Drafter	8.00	HR	0.00	37.33	0.00	\$298.64	<input type="checkbox"/>	<input type="checkbox"/>
33040940	GIS Manager (UXO)	104.00	HR	0.00	73.72	0.00	\$7,667.11	<input type="checkbox"/>	<input type="checkbox"/>
33041101	Airfare	5.00	LS	750.00	0.00	0.00	\$3,750.00	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Technology Detail Report (with Markups)

Element: Site Planning

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33240101	Other Direct Costs	1.00	LS	12,873.53	0.00	0.00	\$12,873.53	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
99041202	Surveying - 3-man Crew	5.00	DAY	0.00	1,219.11	293.66	\$7,563.83	<input type="checkbox"/>	<input checked="" type="checkbox"/>
99041205	Portable GPS Set with Mapping, 5 cm Accuracy	1.00	MO	910.16	0.00	0.00	\$910.16	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Total Element Cost							\$120,846.75		

Technology:

Name: MEC Site Characterization & Removal Assessment (12 months only)

Prime Markup: 100 %

Sub Markup: 0 %

Element: Site Characterization

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33010202	Per Diem (per person)	631.00	DAY	99.00	0.00	0.00	\$62,469.00	<input checked="" type="checkbox"/>	<input type="checkbox"/>
33021530	Differential GPS Unit Rental	4.00	MO	773.93	0.00	0.00	\$3,095.70	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33040210	Geonics EM-61 Metal Locator, Towed (Weekly Rental)	2.00	WK	523.34	0.00	0.00	\$1,046.68	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33040223	Ordnance Locator, Schoenstedt, Model GA-72CD, weekly rental	42.00	WK	81.91	0.00	0.00	\$3,440.40	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33040230	Geonics EM-61 Metal Locator, Hand Held (Weekly Rental)	8.00	WK	433.63	0.00	0.00	\$3,469.00	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33040651	4 X 4 Truck- Rental/Lease	328.00	DAY	0.00	0.00	81.56	\$26,752.71	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Technology Detail Report (with Markups)

Element: Site Characterization

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33040653	All Terrain Vehicle (ATV) - Rental/Lease	13.00	DAY	13.76	0.00	101.92	\$1,503.82	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33040921	Senior UXO Supervisor (SUXOS)	270.00	HR	0.00	58.82	0.00	\$15,880.32	<input type="checkbox"/>	<input type="checkbox"/>
33040923	UXO Project Manager	270.00	HR	0.00	87.28	0.00	\$23,564.90	<input type="checkbox"/>	<input type="checkbox"/>
33040930	UXO QC Specialist	270.00	HR	0.00	55.49	0.00	\$14,982.08	<input type="checkbox"/>	<input type="checkbox"/>
33040931	UXO Safety Officer	270.00	HR	0.00	55.44	0.00	\$14,969.69	<input type="checkbox"/>	<input type="checkbox"/>
33040934	UXO Technician II	1,320.00	HR	0.00	41.75	0.00	\$55,110.26	<input type="checkbox"/>	<input type="checkbox"/>
33040935	UXO Technician III (UXO Supervisor)	570.00	HR	0.00	49.86	0.00	\$28,417.81	<input type="checkbox"/>	<input type="checkbox"/>
33040936	Geophysicist (UXO)	700.00	HR	0.00	88.26	0.00	\$61,782.56	<input type="checkbox"/>	<input type="checkbox"/>
33041001	16oz Standard TNT Booster	740.00	EA	5.50	0.00	0.00	\$4,071.87	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33041002	50 gr/ft Det -Cord (1000 ft roll)	111.00	EA	302.64	0.00	0.00	\$33,593.11	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33041004	12 ft Lead Primadet Non- Electric Detonators	370.00	EA	4.13	0.00	0.00	\$1,526.94	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33041101	Airfare	7.00	LS	750.00	0.00	0.00	\$5,250.00	<input checked="" type="checkbox"/>	<input type="checkbox"/>
33240101	Other Direct Costs	1.00	LS	476.32	0.00	0.00	\$476.32	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Total Element Cost							\$361,403.17		

Technology Detail Report (with Markups)

Technology:

Name: MEC Site Characterization & Removal Assessment (12 months only)

Prime Markup: 100 %

Sub Markup: 0 %

Element: Alternative Analysis/Reporting

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33040921	Senior UXO Supervisor (SUXOS)	64.00	HR	0.00	58.82	0.00	\$3,764.22	<input type="checkbox"/>	<input type="checkbox"/>
33040922	UXO Program Manager	24.00	HR	0.00	116.35	0.00	\$2,792.51	<input type="checkbox"/>	<input type="checkbox"/>
33040923	UXO Project Manager	40.00	HR	0.00	87.28	0.00	\$3,491.10	<input type="checkbox"/>	<input type="checkbox"/>
33040924	UXO Senior Engineer	44.00	HR	0.00	85.50	0.00	\$3,762.17	<input type="checkbox"/>	<input type="checkbox"/>
33040925	UXO Staff Engineer	120.00	HR	0.00	65.73	0.00	\$7,887.23	<input type="checkbox"/>	<input type="checkbox"/>
33040926	UXO Junior Engineer	120.00	HR	0.00	49.72	0.00	\$5,966.15	<input type="checkbox"/>	<input type="checkbox"/>
33040927	UXO Senior Scientist	40.00	HR	0.00	93.05	0.00	\$3,721.95	<input type="checkbox"/>	<input type="checkbox"/>
33040928	UXO Staff Scientist	16.00	HR	0.00	60.43	0.00	\$966.93	<input type="checkbox"/>	<input type="checkbox"/>
33040929	UXO Word Processor	96.00	HR	0.00	30.74	0.00	\$2,951.10	<input type="checkbox"/>	<input type="checkbox"/>
33040936	Geophysicist (UXO)	64.00	HR	0.00	88.26	0.00	\$5,648.69	<input type="checkbox"/>	<input type="checkbox"/>
33040939	UXO Drafter	24.00	HR	0.00	37.33	0.00	\$895.92	<input type="checkbox"/>	<input type="checkbox"/>
33040940	GIS Manager (UXO)	24.00	HR	0.00	73.72	0.00	\$1,769.33	<input type="checkbox"/>	<input type="checkbox"/>
33240101	Other Direct Costs	1.00	LS	12,873.53	0.00	0.00	\$12,873.53	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Total Element Cost							\$56,490.82		
1st Year Technology Cost							\$538,740.74		

Technology Detail Report (with Markups)

System:

RACER Version: 9.1.0
Database Location: S:\PROJECTS\Day & Zimmermann (P0834)\Task Order 004 - Env Remediation
Support\RACER Estimates\RACER_DZI rev 01.mdb

Folder:

Folder Name: KSAAP

Project:

Project ID: KSAAP_ARMY
Project Name: KSAAP_ARMY
Project Category: None

Location

State / Country: KANSAS
City: KANSAS STATE AVERAGE

<u>Location Modifiers</u>	<u>Default</u>	<u>User</u>
Material:	1.01	1.01
Labor:	0.919	0.919
Equipment:	0.989	0.989

Options

Database: System Costs
Cost Database Date: 2007
Report Option: Calendar

Description KSAAP
13

Technology Detail Report (with Markups)

Site:

Site ID: OD Closure Cost Estimate
Site Name: OD Closure Cost Estimate
Site Type: None

Phase Names

Pre-Study: ☐
Study: ☒
Design: ☒
Removal/Interim Action: ☒
Remedial Action: ☒
Operations & Maintenance: ☐
Long Term Monitoring: ☒
Site Closeout: ☒

Documentation

Description: Cost estimate for OD grounds closure.
Support Team: Tetra Tech
References: None

Estimator Information

Estimator Name: Robert Monnig
Estimator Title: Chemical Engineer
Agency/Org./Office: Tetra Tech
Business Address: 415 Oak Street
Kansas City, MO 64114
Telephone Number: 816-412-1775
Email Address: rob.monnig@ttemi.com
Estimate Prepared Date: 10/03/2013

Estimator Signature: _____ **Date:** _____

Technology Detail Report (with Markups)

Reviewer Information

Reviewer Name:

Reviewer Title:

Agency/Org./Office:

Business Address:

Telephone Number:

Email Address:

Date Reviewed:

Reviewer Signature: _____ Date: _____

Technology Detail Report (with Markups)

Phase:

Phase Type: Remedial Action
Phase Name: Open Detonation Area
Description: .

Media/Waste Type

Primary: Ordnance (not residual)
Secondary: N/A

Contaminant

Primary: Ordnance (not residual)
Secondary: None

Approach: Ordnance Removal
Start Date: January, 2014

Rate Groups

Labor: System Labor Rate
Analysis: System Analysis Rate

Phase Markups: System Defaults

Technology Markups

<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>	
MEC Sifting	Yes	100	0
MEC Removal Action	Yes	100	0
RCRA Facility Investigation	Yes	100	0
RCRA Facility Investigation	Yes	100	0
MEC Site Characterization & Removal Assessment	Yes	100	0
Site Close-Out Documentation	Yes	100	0

Technology Detail Report (with Markups)

Technology:

Name: MEC Sifting (12 months only)

Prime Markup: 100 %

Sub Markup: 0 %

Element: Excavation

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
17030234	Crawler-mounted, 4.0 CY, Koehring 1166 Hydraulic Excavator	470.00	HR	0.00	60.09	164.83	\$105,711.18	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Total Element Cost							\$105,711.18		

Technology:

Name: MEC Sifting (12 months only)

Prime Markup: 100 %

Sub Markup: 0 %

Element: Sifting

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
17030285	12 CY, Dump Truck	470.00	HR	0.00	55.37	50.82	\$49,907.69	<input type="checkbox"/>	<input checked="" type="checkbox"/>
17030427	Sand Bags	1,000.00	EA	0.99	0.00	0.00	\$988.17	<input type="checkbox"/>	<input checked="" type="checkbox"/>
17030436	0.75 CY Wheel Loader	1,410.00	HR	0.00	83.62	37.26	\$170,438.27	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33010202	Per Diem (per person)	741.00	DAY	99.00	0.00	0.00	\$73,359.00	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Technology Detail Report (with Markups)

Element: Sifting

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33040515	UXO - Vehicle Modification	4.00	LS	36,003.76	9,814.86	0.00	\$183,274.47	<input type="checkbox"/>	<input type="checkbox"/>
33040651	4 X 4 Truck- Rental/Lease	94.00	DAY	0.00	0.00	81.56	\$7,666.93	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33040662	Trommel Screener	3.00	MO	6,689.66	0.00	0.00	\$20,068.99	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33040663	Grizzly Shaker Unit	3.00	MO	4,013.80	0.00	0.00	\$12,041.39	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33040934	UXO Technician II	2,769.00	HR	0.00	41.75	0.00	\$115,606.30	<input type="checkbox"/>	<input type="checkbox"/>
33040935	UXO Technician III (UXO Supervisor)	1,385.00	HR	0.00	49.86	0.00	\$69,050.28	<input type="checkbox"/>	<input type="checkbox"/>
33188402	Conveyors, Material Handling, horizontal belt, center drive & takeup, 60 fpm, 24" belt, 61.5' length	1.00	EA	7,151.24	1,563.83	0.00	\$8,715.07	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33240101	Other Direct Costs	1.00	LS	41,009.93	0.00	0.00	\$41,009.93	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
33341006	Man-Lift Rental, Scissor, 26' High, 1500# capacity	3.00	MO	3,123.50	0.00	0.00	\$9,370.50	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Total Element Cost							\$761,497.01		

Technology Detail Report (with Markups)

Technology:

Name: MEC Sifting (12 months only)

Prime Markup: 100 %

Sub Markup: 0 %

Element: Backfill

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
17030401	950, 3.00 CY, Backfill with Excavated Material	46,142.00	CY	0.00	0.64	0.96	\$73,848.92	<input type="checkbox"/>	<input checked="" type="checkbox"/>
17040101	Cleaning Up, site debris clean up and removal	6.00	ACR	0.00	448.60	51.00	\$2,997.57	<input type="checkbox"/>	<input checked="" type="checkbox"/>
18050101	Area Preparation, 67% Level & 33% Slope	6.00	ACR	0.00	16.72	26.74	\$260.75	<input type="checkbox"/>	<input checked="" type="checkbox"/>
18050401	Seeding, 67% Level & 33% Slope, Hydroseeding	6.00	ACR	1,891.81	452.16	561.57	\$17,433.25	<input type="checkbox"/>	<input type="checkbox"/>
18050408	Fertilizer, Hydro Spread	6.00	ACR	125.17	85.11	29.13	\$1,436.47	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33010115	Demobilize Equipment (Soils)	1.00	LS	3,530.11	0.00	0.00	\$3,530.11	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Total Element Cost							\$99,507.09		

1st Year Technology Cost \$966,715.27

Technology Detail Report (with Markups)

System:

RACER Version: 9.1.0
Database Location: S:\PROJECTS\Day & Zimmermann (P0834)\Task Order 004 - Env Remediation
Support\RACER Estimates\RACER_DZI rev 01.mdb

Folder:

Folder Name: KSAAP

Project:

Project ID: KSAAP_ARMY
Project Name: KSAAP_ARMY
Project Category: None

Location

State / Country: KANSAS
City: KANSAS STATE AVERAGE

<u>Location Modifiers</u>	<u>Default</u>	<u>User</u>
Material:	1.01	1.01
Labor:	0.919	0.919
Equipment:	0.989	0.989

Options

Database: System Costs
Cost Database Date: 2007
Report Option: Calendar

Description KSAAP
13

Technology Detail Report (with Markups)

Site:

Site ID: OD Closure Cost Estimate
Site Name: OD Closure Cost Estimate
Site Type: None

Phase Names

Pre-Study: ☐
Study: ☒
Design: ☒
Removal/Interim Action: ☒
Remedial Action: ☒
Operations & Maintenance: ☐
Long Term Monitoring: ☒
Site Closeout: ☒

Documentation

Description: Cost estimate for OD grounds closure.
Support Team: Tetra Tech
References: None

Estimator Information

Estimator Name: Robert Monnig
Estimator Title: Chemical Engineer
Agency/Org./Office: Tetra Tech
Business Address: 415 Oak Street
Kansas City, MO 64114
Telephone Number: 816-412-1775
Email Address: rob.monnig@ttemi.com
Estimate Prepared Date: 10/03/2013

Estimator Signature: _____ **Date:** _____

Technology Detail Report (with Markups)

Reviewer Information

Reviewer Name:

Reviewer Title:

Agency/Org./Office:

Business Address:

Telephone Number:

Email Address:

Date Reviewed:

Reviewer Signature: _____ Date: _____

Technology Detail Report (with Markups)

Phase:

Phase Type: Remedial Action
Phase Name: Open Detonation Area
Description: .

Media/Waste Type

Primary: Ordnance (not residual)
Secondary: N/A

Contaminant

Primary: Ordnance (not residual)
Secondary: None

Approach: Ordnance Removal
Start Date: January, 2014

Rate Groups

Labor: System Labor Rate
Analysis: System Analysis Rate

Phase Markups: System Defaults

Technology Markups

<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>	
MEC Sifting	Yes	100	0
MEC Removal Action	Yes	100	0
RCRA Facility Investigation	Yes	100	0
RCRA Facility Investigation	Yes	100	0
MEC Site Characterization & Removal Assessment	Yes	100	0
Site Close-Out Documentation	Yes	100	0

Technology Detail Report (with Markups)

Technology:

Name: MEC Sifting (12 months only)

Prime Markup: 100 %

Sub Markup: 0 %

Element: Excavation

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
17030234	Crawler-mounted, 4.0 CY, Koehring 1166 Hydraulic Excavator	410.00	HR	0.00	60.09	164.83	\$92,216.13	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Total Element Cost							\$92,216.13		

Technology:

Name: MEC Sifting (12 months only)

Prime Markup: 100 %

Sub Markup: 0 %

Element: Sifting

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
17030285	12 CY, Dump Truck	410.00	HR	0.00	55.37	50.82	\$43,536.50	<input type="checkbox"/>	<input checked="" type="checkbox"/>
17030427	Sand Bags	1,000.00	EA	0.99	0.00	0.00	\$988.17	<input type="checkbox"/>	<input checked="" type="checkbox"/>
17030436	0.75 CY Wheel Loader	1,230.00	HR	0.00	83.62	37.26	\$148,680.19	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33010202	Per Diem (per person)	646.00	DAY	99.00	0.00	0.00	\$63,954.00	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Technology Detail Report (with Markups)

Element: Sifting

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33040515	UXO - Vehicle Modification	4.00	LS	36,003.76	9,814.86	0.00	\$183,274.47	<input type="checkbox"/>	<input type="checkbox"/>
33040651	4 X 4 Truck- Rental/Lease	82.00	DAY	0.00	0.00	81.56	\$6,688.18	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33040662	Trommel Screener	3.00	MO	6,689.66	0.00	0.00	\$20,068.99	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33040663	Grizzly Shaker Unit	3.00	MO	4,013.80	0.00	0.00	\$12,041.39	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33040934	UXO Technician II	2,442.00	HR	0.00	41.75	0.00	\$101,953.99	<input type="checkbox"/>	<input type="checkbox"/>
33040935	UXO Technician III (UXO Supervisor)	1,221.00	HR	0.00	49.86	0.00	\$60,873.93	<input type="checkbox"/>	<input type="checkbox"/>
33188402	Conveyors, Material Handling, horizontal belt, center drive & takeup, 60 fpm, 24" belt, 61.5' length	1.00	EA	7,151.24	1,563.83	0.00	\$8,715.07	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33240101	Other Direct Costs	1.00	LS	37,715.23	0.00	0.00	\$37,715.23	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
33341006	Man-Lift Rental, Scissor, 26' High, 1500# capacity	3.00	MO	3,123.50	0.00	0.00	\$9,370.50	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Total Element Cost							\$697,860.61		

Technology Detail Report (with Markups)

Technology:

Name: MEC Sifting (12 months only)

Prime Markup: 100 %

Sub Markup: 0 %

Element: Backfill

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
17030401	950, 3.00 CY, Backfill with Excavated Material	40,689.00	CY	0.00	0.64	0.96	\$65,121.56	<input type="checkbox"/>	<input checked="" type="checkbox"/>
17040101	Cleaning Up, site debris clean up and removal	10.00	ACR	0.00	448.60	51.00	\$4,995.95	<input type="checkbox"/>	<input checked="" type="checkbox"/>
18050101	Area Preparation, 67% Level & 33% Slope	10.00	ACR	0.00	16.72	26.74	\$434.59	<input type="checkbox"/>	<input checked="" type="checkbox"/>
18050401	Seeding, 67% Level & 33% Slope, Hydroseeding	10.00	ACR	1,891.81	452.16	561.57	\$29,055.42	<input type="checkbox"/>	<input type="checkbox"/>
18050408	Fertilizer, Hydro Spread	10.00	ACR	125.17	85.11	29.13	\$2,394.12	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33010115	Demobilize Equipment (Soils)	1.00	LS	3,530.11	0.00	0.00	\$3,530.11	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Total Element Cost							\$105,531.75		

1st Year Technology Cost \$895,608.49

Technology Detail Report (with Markups)

System:

RACER Version: 9.1.0
Database Location: S:\PROJECTS\Day & Zimmermann (P0834)\Task Order 004 - Env Remediation
Support\RACER Estimates\RACER_DZI rev 01.mdb

Folder:

Folder Name: KSAAP

Project:

Project ID: KSAAP_ARMY
Project Name: KSAAP_ARMY
Project Category: None

Location

State / Country: KANSAS
City: KANSAS STATE AVERAGE

<u>Location Modifiers</u>	<u>Default</u>	<u>User</u>
Material:	1.01	1.01
Labor:	0.919	0.919
Equipment:	0.989	0.989

Options

Database: System Costs
Cost Database Date: 2007
Report Option: Calendar

Description KSAAP
13

Technology Detail Report (with Markups)

Site:

Site ID: OD Closure Cost Estimate
Site Name: OD Closure Cost Estimate
Site Type: None

Phase Names

Pre-Study: ☐
Study: ☒
Design: ☒
Removal/Interim Action: ☒
Remedial Action: ☒
Operations & Maintenance: ☐
Long Term Monitoring: ☒
Site Closeout: ☒

Documentation

Description: Cost estimate for OD grounds closure.
Support Team: Tetra Tech
References: None

Estimator Information

Estimator Name: Robert Monnig
Estimator Title: Chemical Engineer
Agency/Org./Office: Tetra Tech
Business Address: 415 Oak Street
Kansas City, MO 64114
Telephone Number: 816-412-1775
Email Address: rob.monnig@ttemi.com
Estimate Prepared Date: 10/03/2013

Estimator Signature: _____ **Date:** _____

Technology Detail Report (with Markups)

Reviewer Information

Reviewer Name:

Reviewer Title:

Agency/Org./Office:

Business Address:

Telephone Number:

Email Address:

Date Reviewed:

Reviewer Signature: _____ Date: _____

Technology Detail Report (with Markups)

Phase:

Phase Type: Remedial Action
Phase Name: Open Detonation Area - Outside Fence
Description: ...

Media/Waste Type

Primary: Ordnance (not residual)
Secondary: N/A

Contaminant

Primary: Ordnance (not residual)
Secondary: None

Approach: Ordnance Removal
Start Date: January, 2014

Rate Groups

Labor: System Labor Rate
Analysis: System Analysis Rate

Phase Markups: System Defaults

Technology Markups

<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>	
MEC Sifting	Yes	100	0
MEC Removal Action	Yes	100	0
RCRA Facility Investigation	Yes	100	0
RCRA Facility Investigation	Yes	100	0
Site Close-Out Documentation	Yes	100	0
Site Close-Out Documentation	Yes	100	0
MEC Site Characterization & Removal Assessment	Yes	100	0
Site Close-Out Documentation	Yes	100	0

Technology Detail Report (with Markups)

Technology:

Name: RCRA Facility Investigation (12 months only)

Prime Markup: 100 %

Sub Markup: 0 %

Element: Sampling and Analysis

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33010104	Sample collection, vehicle mileage charge, car or van	360.00	MI	0.45	0.00	0.00	\$160.20	<input checked="" type="checkbox"/>	<input type="checkbox"/>
33010202	Per Diem (per person)	8.00	DAY	99.00	0.00	0.00	\$792.00	<input checked="" type="checkbox"/>	<input type="checkbox"/>
33020343	Photo-Ionization Detector, HnU, Weekly Rental	1.00	WK	240.54	0.00	0.00	\$240.54	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33020401	Disposable Materials per Sample	126.00	EA	11.07	0.00	0.00	\$1,395.30	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33020402	Decontamination Materials per Sample	126.00	EA	10.16	0.00	0.00	\$1,279.91	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33020603	Surface Soil Sampling Equipment	1.00	EA	514.89	0.00	0.00	\$514.89	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33220109	Staff Scientist	188.00	HR	0.00	93.25	0.00	\$17,530.90	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33220112	Field Technician	188.00	HR	0.00	71.87	0.00	\$13,510.71	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Total Element Cost							\$35,424.44		
1st Year Technology Cost							\$35,424.44		

Technology Detail Report (with Markups)

System:

RACER Version: 9.1.0
Database Location: S:\PROJECTS\Day & Zimmermann (P0834)\Task Order 004 - Env Remediation
Support\RACER Estimates\RACER_DZI rev 01.mdb

Folder:

Folder Name: KSAAP

Project:

Project ID: KSAAP_ARMY
Project Name: KSAAP_ARMY
Project Category: None

Location

State / Country: KANSAS
City: KANSAS STATE AVERAGE

<u>Location Modifiers</u>	<u>Default</u>	<u>User</u>
Material:	1.01	1.01
Labor:	0.919	0.919
Equipment:	0.989	0.989

Options

Database: System Costs
Cost Database Date: 2007
Report Option: Calendar

Description KSAAP
13

Technology Detail Report (with Markups)

Site:

Site ID: OD Closure Cost Estimate
Site Name: OD Closure Cost Estimate
Site Type: None

Phase Names

Pre-Study: ☐
Study: ☒
Design: ☒
Removal/Interim Action: ☒
Remedial Action: ☒
Operations & Maintenance: ☐
Long Term Monitoring: ☒
Site Closeout: ☒

Documentation

Description: Cost estimate for OD grounds closure.
Support Team: Tetra Tech
References: None

Estimator Information

Estimator Name: Robert Monnig
Estimator Title: Chemical Engineer
Agency/Org./Office: Tetra Tech
Business Address: 415 Oak Street
Kansas City, MO 64114
Telephone Number: 816-412-1775
Email Address: rob.monnig@ttemi.com
Estimate Prepared Date: 10/03/2013

Estimator Signature: _____ **Date:** _____

Technology Detail Report (with Markups)

Reviewer Information

Reviewer Name:

Reviewer Title:

Agency/Org./Office:

Business Address:

Telephone Number:

Email Address:

Date Reviewed:

Reviewer Signature: _____ Date: _____

Technology Detail Report (with Markups)

Phase:

Phase Type: Remedial Action
Phase Name: Open Detonation Area - Outside Fence
Description: ...

Media/Waste Type

Primary: Ordnance (not residual)
Secondary: N/A

Contaminant

Primary: Ordnance (not residual)
Secondary: None

Approach: Ordnance Removal
Start Date: January, 2014

Rate Groups

Labor: System Labor Rate
Analysis: System Analysis Rate

Phase Markups: System Defaults

Technology Markups

	<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>
MEC Sifting	Yes	100	0
MEC Removal Action	Yes	100	0
RCRA Facility Investigation	Yes	100	0
RCRA Facility Investigation	Yes	100	0
Site Close-Out Documentation	Yes	100	0
Site Close-Out Documentation	Yes	100	0
MEC Site Characterization & Removal Assessment	Yes	100	0
Monitoring	Yes	100	0
RCRA Facility Investigation	Yes	100	0
Site Inspection	Yes	100	0
Remedial Investigation	Yes	100	0

Technology Detail Report (with Markups)

Technology:

Name: Site Inspection (12 months only)

Prime Markup: 100 %

Sub Markup: 0 %

Element: Site Investigation

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33220102	Project Manager	14.00	HR	0.00	149.96	0.00	\$2,099.39	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33220109	Staff Scientist	95.00	HR	0.00	93.25	0.00	\$8,858.70	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33220110	QA/QC Officer	8.00	HR	0.00	122.69	0.00	\$981.49	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33220111	Certified Industrial Hygienist	8.00	HR	0.00	166.40	0.00	\$1,331.21	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33220114	Word Processing/Clerical	19.00	HR	0.00	64.96	0.00	\$1,234.30	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33220115	Draftsman/CADD	40.00	HR	0.00	77.82	0.00	\$3,112.82	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33240101	Other Direct Costs	1.00	LS	118.12	0.00	0.00	\$118.12	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Total Element Cost							\$17,736.03		
1st Year Technology Cost							\$17,736.03		

Technology Detail Report (with Markups)

System:

RACER Version: 9.1.0
Database Location: S:\PROJECTS\Day & Zimmermann (P0834)\Task Order 004 - Env Remediation
Support\RACER Estimates\RACER_DZI rev 01.mdb

Folder:

Folder Name: KSAAP

Project:

Project ID: KSAAP_ARMY
Project Name: KSAAP_ARMY
Project Category: None

Location

State / Country: KANSAS
City: KANSAS STATE AVERAGE

<u>Location Modifiers</u>	<u>Default</u>	<u>User</u>
Material:	1.01	1.01
Labor:	0.919	0.919
Equipment:	0.989	0.989

Options

Database: System Costs
Cost Database Date: 2007
Report Option: Calendar

Description KSAAP
13

Technology Detail Report (with Markups)

Site:

Site ID: OD Closure Cost Estimate
Site Name: OD Closure Cost Estimate
Site Type: None

Phase Names

Pre-Study: ☐
Study: ☒
Design: ☒
Removal/Interim Action: ☒
Remedial Action: ☒
Operations & Maintenance: ☐
Long Term Monitoring: ☒
Site Closeout: ☒

Documentation

Description: Cost estimate for OD grounds closure.
Support Team: Tetra Tech
References: None

Estimator Information

Estimator Name: Robert Monnig
Estimator Title: Chemical Engineer
Agency/Org./Office: Tetra Tech
Business Address: 415 Oak Street
Kansas City, MO 64114
Telephone Number: 816-412-1775
Email Address: rob.monnig@ttemi.com
Estimate Prepared Date: 10/03/2013

Estimator Signature: _____ **Date:** _____

Technology Detail Report (with Markups)

Reviewer Information

Reviewer Name:

Reviewer Title:

Agency/Org./Office:

Business Address:

Telephone Number:

Email Address:

Date Reviewed:

Reviewer Signature: _____ Date: _____

Technology Detail Report (with Markups)

Phase:

Phase Type: Remedial Action
Phase Name: Open Detonation Area - Outside Fence
Description:

Media/Waste Type

Primary: Ordnance (not residual)
Secondary: N/A

Contaminant

Primary: Ordnance (not residual)
Secondary: None

Approach: Ordnance Removal
Start Date: January, 2014

Rate Groups

Labor: System Labor Rate
Analysis: System Analysis Rate

Phase Markups: System Defaults

Technology Markups

RCRA Facility Investigation
MEC Site Characterization & Removal Assessment
Site Inspection

<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>
Yes	100	0
Yes	100	0
Yes	100	0

Technology Detail Report (with Markups)

Technology:

Name: MEC Site Characterization & Removal Assessment (12 months only)

Prime Markup: 100 %

Sub Markup: 0 %

Element: Site Planning

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
17010401	Chipping brush, light brush	85.00	ACR	0.00	1,074.34	450.67	\$129,626.04	<input type="checkbox"/>	<input checked="" type="checkbox"/>
17010402	Chipping brush, medium brush	85.00	ACR	0.00	1,381.23	579.40	\$166,653.59	<input type="checkbox"/>	<input checked="" type="checkbox"/>
17010403	Chipping brush, heavy brush	60.00	ACR	0.00	2,686.34	1,126.87	\$228,792.50	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33010108	Sedan, Automobile, Rental	5.00	DAY	63.06	0.00	0.00	\$315.32	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33010202	Per Diem (per person)	5.00	DAY	99.00	0.00	0.00	\$495.00	<input checked="" type="checkbox"/>	<input type="checkbox"/>
33040921	Senior UXO Supervisor (SUXOS)	720.00	HR	0.00	58.82	0.00	\$42,347.52	<input type="checkbox"/>	<input type="checkbox"/>
33040923	UXO Project Manager	772.00	HR	0.00	87.28	0.00	\$67,378.15	<input type="checkbox"/>	<input type="checkbox"/>
33040926	UXO Junior Engineer	208.00	HR	0.00	49.72	0.00	\$10,341.32	<input type="checkbox"/>	<input type="checkbox"/>
33040930	UXO QC Specialist	720.00	HR	0.00	55.49	0.00	\$39,952.22	<input type="checkbox"/>	<input type="checkbox"/>
33040931	UXO Safety Officer	720.00	HR	0.00	55.44	0.00	\$39,919.18	<input type="checkbox"/>	<input type="checkbox"/>
33040935	UXO Technician III (UXO Supervisor)	1,920.00	HR	0.00	49.86	0.00	\$95,723.14	<input type="checkbox"/>	<input type="checkbox"/>
33040936	Geophysicist (UXO)	104.00	HR	0.00	88.26	0.00	\$9,179.12	<input type="checkbox"/>	<input type="checkbox"/>
33040940	GIS Manager (UXO)	104.00	HR	0.00	73.72	0.00	\$7,667.11	<input type="checkbox"/>	<input type="checkbox"/>
33041101	Airfare	1.00	LS	750.00	0.00	0.00	\$750.00	<input checked="" type="checkbox"/>	<input type="checkbox"/>
33240101	Other Direct Costs	1.00	LS	6,436.76	0.00	0.00	\$6,436.76	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
99041202	Surveying - 3-man Crew	72.00	DAY	0.00	1,219.11	293.66	\$108,919.22	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Technology Detail Report (with Markups)

Element: Site Planning

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
99041205	Portable GPS Set with Mapping, 5 cm Accuracy	5.00	MO	910.16	0.00	0.00	\$4,550.79	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Total Element Cost							\$959,046.99		

Technology:

Name: MEC Site Characterization & Removal Assessment (12 months only)

Prime Markup: 100 %

Sub Markup: 0 %

Element: Site Characterization

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33010202	Per Diem (per person)	4,186.00	DAY	99.00	0.00	0.00	\$414,414.00	<input checked="" type="checkbox"/>	<input type="checkbox"/>
33021530	Differential GPS Unit Rental	1.00	MO	773.93	0.00	0.00	\$773.93	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33040223	Ordnance Locator, Schoenstedt, Model GA-72CD, weekly rental	546.00	WK	81.91	0.00	0.00	\$44,725.17	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33040651	4 X 4 Truck- Rental/Lease	1,456.00	DAY	0.00	0.00	81.56	\$118,755.92	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33040921	Senior UXO Supervisor (SUXOS)	520.00	HR	0.00	58.82	0.00	\$30,584.32	<input type="checkbox"/>	<input type="checkbox"/>
33040923	UXO Project Manager	520.00	HR	0.00	87.28	0.00	\$45,384.25	<input type="checkbox"/>	<input type="checkbox"/>
33040930	UXO QC Specialist	520.00	HR	0.00	55.49	0.00	\$28,854.38	<input type="checkbox"/>	<input type="checkbox"/>
33040931	UXO Safety Officer	520.00	HR	0.00	55.44	0.00	\$28,830.52	<input type="checkbox"/>	<input type="checkbox"/>
33040934	UXO Technician II	18,720.00	HR	0.00	41.75	0.00	\$781,563.74	<input type="checkbox"/>	<input type="checkbox"/>

Technology Detail Report (with Markups)

Element: Site Characterization

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33040935	UXO Technician III (UXO Supervisor)	3,120.00	HR	0.00	49.86	0.00	\$155,550.10	<input type="checkbox"/>	<input type="checkbox"/>
33041001	16oz Standard TNT Booster	1,024.00	EA	5.50	0.00	0.00	\$5,634.59	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33041002	50 gr/ft Det -Cord (1000 ft roll)	154.00	EA	302.64	0.00	0.00	\$46,606.65	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33041004	12 ft Lead Primadet Non- Electric Detonators	512.00	EA	4.13	0.00	0.00	\$2,112.96	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33041101	Airfare	4.00	LS	750.00	0.00	0.00	\$3,000.00	<input checked="" type="checkbox"/>	<input type="checkbox"/>
33240101	Other Direct Costs	1.00	LS	659.25	0.00	0.00	\$659.25	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Total Element Cost							\$1,707,449.78		

Technology:

Name: MEC Site Characterization & Removal Assessment (12 months only)

Prime Markup: 100 %

Sub Markup: 0 %

Element: Alternative Analysis/Reporting

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33040921	Senior UXO Supervisor (SUXOS)	40.00	HR	0.00	58.82	0.00	\$2,352.64	<input type="checkbox"/>	<input type="checkbox"/>
33040922	UXO Program Manager	8.00	HR	0.00	116.35	0.00	\$930.84	<input type="checkbox"/>	<input type="checkbox"/>
33040923	UXO Project Manager	40.00	HR	0.00	87.28	0.00	\$3,491.10	<input type="checkbox"/>	<input type="checkbox"/>
33040924	UXO Senior Engineer	20.00	HR	0.00	85.50	0.00	\$1,710.08	<input type="checkbox"/>	<input type="checkbox"/>
33040925	UXO Staff Engineer	80.00	HR	0.00	65.73	0.00	\$5,258.15	<input type="checkbox"/>	<input type="checkbox"/>

Technology Detail Report (with Markups)

Element: Alternative Analysis/Reporting

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override	Markups Applied
33040926	UXO Junior Engineer	40.00	HR	0.00	49.72	0.00	\$1,988.72	<input type="checkbox"/>	<input type="checkbox"/>
33040927	UXO Senior Scientist	40.00	HR	0.00	93.05	0.00	\$3,721.95	<input type="checkbox"/>	<input type="checkbox"/>
33040928	UXO Staff Scientist	16.00	HR	0.00	60.43	0.00	\$966.93	<input type="checkbox"/>	<input type="checkbox"/>
33040929	UXO Word Processor	64.00	HR	0.00	30.74	0.00	\$1,967.40	<input type="checkbox"/>	<input type="checkbox"/>
33040936	Geophysicist (UXO)	32.00	HR	0.00	88.26	0.00	\$2,824.35	<input type="checkbox"/>	<input type="checkbox"/>
33040939	UXO Drafter	24.00	HR	0.00	37.33	0.00	\$895.92	<input type="checkbox"/>	<input type="checkbox"/>
33040940	GIS Manager (UXO)	24.00	HR	0.00	73.72	0.00	\$1,769.33	<input type="checkbox"/>	<input type="checkbox"/>
33240101	Other Direct Costs	1.00	LS	9,655.14	0.00	0.00	\$9,655.14	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Total Element Cost							\$37,532.54		
1st Year Technology Cost							\$2,704,029.31		

APPENDIX I-3

FINANCIAL GUARANTEE BOND

Financial Guarantee Bond

Date bond executed: January 26, 2015

Effective date: January 1, 2015

Principal: Day & Zimmermann Kansas, LLC
1500 Spring Garden Street
Philadelphia, PA 19130

Type of Organization: Corporation

State of incorporation: Delaware

Surety: Westchester Fire Insurance Company, 436 Walnut Street, Philadelphia, PA 19106

KSR000511964 – Permit for Hazardous Waste Management Facility, Kansas Army Ammunition Plant, 21017 Scott Road, Parsons, KS 67357 guaranteed by this bond for closure, post closure and corrective action.

TOTAL PENAL SUM OF BOND: \$11,602,935.00

SURETY'S BOND NUMBER: K09101548

Know All Persons By These Presents, That we, the Principal and Surety hereto are firmly bound to the department, in the above penal sum for the payment of which we bind ourselves, our heirs, executors, administrators, successors, and assigns jointly and severally; provided that, where the Surety are corporations acting as co-sureties, we, the Sureties, bind ourselves in such sum "jointly and severally" only for the purpose of allowing a joint action or actions against any or all of us, and for all other purposes each Surety binds itself, jointly and severally with the Principal, for the payment of such sum only as is set forth opposite the name of such Surety, but if no limit of liability is indicated, the limit of liability shall be the full amount of the penal sum.

Whereas said Principal is required, under the Kansas hazardous waste management program, to have a permit or interim status in order to own or operate each hazardous waste management facility identified above, and

Whereas said Principal is required to provide financial assurance for closure, or closure and post-closure care, as a condition of the permit or interim status, and

Whereas said Principal shall establish a standby trust fund as is required when a surety bond is used to provide such financial assurance;

Now, Therefore, the conditions of the obligation are such that if the Principal shall faithfully, before the beginning of final closure of each facility identified above, fund the standby trust fund in the amount(s) identified above for the facility,

Or, if the Principal shall fund the standby trust fund in such amount(s) within 15 days after a final order to begin closure is issued by the secretary or a U.S. district court or other court of competent jurisdiction,

Or, if the Principal shall provide alternate financial assurance, as specified in subpart H of 40 CFR part 264 or 265, as applicable, and obtain the secretary's written approval of such assurance, within 90 days after the date notice of cancellation is received by both the Principal and the secretary from the Surety, then this obligation shall be null and void; otherwise it is to remain in full force and effect.

The Surety shall become liable on this bond obligation only when the Principal has failed to fulfill the conditions described above. Upon notification by the secretary that the Principal has failed to perform as guaranteed by this bond, the Surety shall place funds in the amount guaranteed for the facility(ies) into the standby trust fund as directed by the secretary.

The liability of the Surety shall not be discharged by any payment or succession of payments hereunder, unless and until such payment or payments shall amount in the aggregate to the penal sum of the bond, but in no event shall the obligation of the Surety hereunder exceed the amount of said penal sum.

The Surety may cancel the bond by sending notice of cancellation by certified mail to the Principal and to the secretary, provided, however, that cancellation shall not occur during the 120 days beginning on the date of receipt of the notice of cancellation by both the Principal and the secretary, as evidenced by the return receipts.

The Principal may terminate this bond by sending written notice to the Surety, provided, however, that no such notice shall become effective until the Surety receive(s) written authorization for termination of the bond by the secretary.

In Witness Whereof, the Principal and Surety have executed this Financial Guarantee Bond and have affixed their seals on the date set forth above.

The persons whose signatures appear below hereby certify that they are authorized to execute this surety bond on behalf of the Principal and Surety and that the wording of this surety bond is identical to the wording specified in 40 CFR 264.151(b) with the inclusion of corrective action and K.A.R. Article 31 as such regulations were constituted on the date this bond was executed.

Principal: Day & Zimmermann Kansas, LLC

Signature _____

Name Joseph Ritzel

Title Chief Financial Officer

Corporate seal

Corporate Surety

Westchester Fire Insurance Company
436 Walnut Street, Philadelphia, PA 19106

State of incorporation: Pennsylvania

Liability limit: \$90,657,000

Signature(s) _____
Nancy Nigro, Attorney-In-Fact

Corporate seal

Bond premium: \$203,051.00

Power of Attorney

WESTCHESTER FIRE INSURANCE COMPANY

Know all men by these presents: That WESTCHESTER FIRE INSURANCE COMPANY, a corporation of the Commonwealth of Pennsylvania pursuant to the following Resolution, adopted by the Board of Directors of the said Company on December 11, 2006, to wit:

"RESOLVED, that the following authorizations relate to the execution, for and on behalf of the Company, of bonds, undertakings, recognizances, contracts and other written commitments of the Company entered into the ordinary course of business (each a "Written Commitment"):

- (1) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise.
- (2) Each duly appointed attorney-in-fact of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise, to the extent that such action is authorized by the grant of powers provided for in such persons written appointment as such attorney-in-fact.
- (3) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to appoint in writing any person the attorney-in-fact of the Company with full power and authority to execute, for and on behalf of the Company, under the seal of the Company or otherwise, such Written Commitments of the Company as may be specified in such written appointment, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.
- (4) Each of the Chairman, the President and Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to delegate in writing any other officer of the Company the authority to execute, for and on behalf of the Company, under the Company's seal or otherwise, such Written Commitments of the Company as are specified in such written delegation, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.
- (5) The signature of any officer or other person executing any Written Commitment or appointment or delegation pursuant to this Resolution, and the seal of the Company, may be affixed by facsimile on such Written Commitment or written appointment or delegation.

FURTHER RESOLVED, that the foregoing Resolution shall not be deemed to be an exclusive statement of the powers and authority of officers, employees and other persons to act for and on behalf of the Company, and such Resolution shall not limit or otherwise affect the exercise of any such power or authority otherwise validly granted or vested.

Does hereby nominate, constitute and appoint DOUGLAS S. HANSEN, ERIC J. FOLLMAN, SR., FERNANDA L. DePAOLANTONIO, JOHN P. FOLLMAN, JR., KATHLEEN M. ROWE, LYNN M. WHEELLOCK, NANCY NIGRO, all of the City of WAYNE, Pennsylvania, each individually if there be more than one named, its true and lawful attorney-in-fact, to make, execute, seal and deliver on its behalf, and as its act and deed any and all bonds, undertakings, recognizances, contracts and other writings in the nature thereof in penalties not exceeding Twenty Five million dollars & zero cents (\$25,000,000.00) and the execution of such writings in pursuance of these presents shall be as binding upon said Company, as fully and amply as if they had been duly executed and acknowledged by the regularly elected officers of the Company at its principal office.

IN WITNESS WHEREOF, the said Stephen M. Haney, Vice-President, has hereunto subscribed his name and affixed the Corporate seal of the said WESTCHESTER FIRE INSURANCE COMPANY this 5 day of March 2014.

WESTCHESTER FIRE INSURANCE COMPANY



Stephen M. Haney
Stephen M. Haney, Vice President

COMMONWEALTH OF PENNSYLVANIA
COUNTY OF PHILADELPHIA ss.

On this 5 day of March, AD 2014 before me, a Notary Public of the Commonwealth of Pennsylvania in and for the County of Philadelphia came Stephen M. Haney, Vice-President of the WESTCHESTER FIRE INSURANCE COMPANY to me personally known to be the individual and officer who executed the preceding instrument, and he acknowledged that he executed the same, and that the seal affixed to the preceding instrument is the corporate seal of said Company, that the said corporate seal and his signature were duly affixed by the authority and direction of the said corporation, and that Resolution, adopted by the Board of Directors of said Company, referred to in the preceding instrument, is now in force.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my official seal at the City of Philadelphia the day and year first above written.



COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
KAREN E. BRANDT, Notary Public
City of Philadelphia, Phila. County
My Commission Expires September 26, 2014

Karen E. Brandt
Notary Public

I, the undersigned Assistant Secretary of the WESTCHESTER FIRE INSURANCE COMPANY, do hereby certify that the original POWER OF ATTORNEY, of which the foregoing is a substantially true and correct copy, is in full force and effect.

In witness whereof, I have hereunto subscribed my name as Assistant Secretary, and affixed the corporate seal of the Corporation, this 26 day of January 2015.



William L. Kelly
William L. Kelly, Assistant Secretary

THIS POWER OF ATTORNEY MAY NOT BE USED TO EXECUTE ANY BOND WITH AN INCEPTION DATE AFTER March 05, 2016.

APPENDIX I-4

EXECUTED TRUST AGREEMENT

KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT
BUREAU OF WASTE MANAGEMENT
Hazardous Waste Form 5230
TRUST AGREEMENT

Trust Agreement, the "Agreement", made effective on June 7, 2015

by and between Day & Zimmermann Kansas LLC, a Delaware corporation, the **Grantor**, and Citizen's Bank, a national bank, as **Trustee**.

Whereas, the Kansas Department of Health and Environment (KDHE), an administrative department of the State of Kansas, has established certain regulations at K.A.R. 28 Article 31 implementing hazardous waste provisions of K.S.A. 65-3431 *et. seq.*, and Subtitle C of the Resource Conservation and Recovery Act as amended (RCRA), applicable to the Grantor, requiring that the owner or operator of a Kansas hazardous waste facility shall provide assurance that funds will be available to pay the costs of closure, post-closure care, corrective action, or any combination of these, when needed; and

Whereas, the Grantor has elected to establish a trust to provide all or part of such financial assurance for the hazardous waste facilities (the facilities) identified in Schedule A to this Agreement; and

Whereas, the Grantor, acting through its duly authorized officers, has selected the Trustee to be the trustee under this Agreement, and the Trustee is willing to act as trustee;

Now Therefore, the Grantor and the Trustee agree as follows:

Section 1. Definitions. As used in this Agreement:

- (a) The term "Grantor" means the owner or operator who enters into this Agreement and any successors or assigns of the Grantor;
- (b) The term "Trustee" means the Trustee who enters into this Agreement and any successor Trustee.

Section 2. Identification of Facilities and Cost Estimates: This Agreement pertains to the facilities and cost estimates identified on attached Schedule A.

Section 3. Establishment of the Fund. The Grantor and the Trustee hereby establish a trust fund, "the Fund", for the benefit of KDHE. The Grantor and the Trustee intend that no third party have access to the Fund except as herein provided. The Fund is established initially as consisting of the property, which is acceptable to the Trustee, described in Schedule B attached hereto. Such property and any other property subsequently transferred to the Trustee is referred to as the Fund, together with all earnings and profits thereon, less any payments or distributions made by the Trustee pursuant to this Agreement. The Fund shall be held by Trustee, IN TRUST, as hereinafter provided. The Trustee shall not be responsible nor shall it undertake any responsibility for the amount or adequacy of, nor any duty to collect from the Grantor, any payments necessary to discharge any liabilities of the Grantor established by KDHE.

Section 4. Payment for Closure, Post-Closure Care, Corrective Action, or Any Combination of These. The Trustee shall make payments from the Fund as KDHE shall direct, in writing, to provide for the payment of the costs of closure, post-closure care, corrective action, or any combination of these, at the facilities covered by this Agreement. The Trustee shall reimburse the Grantor or other persons as specified by KDHE from the Fund for closure, post-closure care, corrective action, or any combination of these, in such amounts as KDHE shall direct in writing. In addition, the Trustee shall refund to the Grantor such amounts as KDHE shall specify in writing. The amounts duly reimbursed or refunded shall no longer constitute a part of the Fund as defined herein.

Section 5. Payments Comprising the Fund. Payments made to the Trustee for deposit into the Fund shall consist of cash or securities acceptable to the Trustee.

Section 6. Trustee Management. The Trustee shall invest and reinvest the principal and income of the Fund and keep the Fund invested as a single fund, without distinction between principal and income, in accordance with general investment policies and guidelines which the Grantor may communicate in writing to the Trustee from time to time, subject however, to the provisions of this section. In investing, reinvesting, exchanging, selling, and managing the Fund, the Trustee shall discharge his duties with respect to the trust fund solely in the interest of KDHE, and with the care, skill, prudence, and diligence under the circumstances then prevailing which persons of prudence, acting in like capacity and familiar with such matters, would use in the conduct of an enterprise of a like character and with like aims, except that:

- (a) Securities or other obligations of the Grantor, or of any other owner or operator of the facilities, or of any of their affiliates as defined in the Investment Company Act of 1940, 15 U.S.C. 80a-2.(a), as amended, shall not be acquired or held, unless they are securities or other obligations of the federal or a state government;
- (b) The Trustee is authorized to invest the Fund in any time or demand deposits of the Trustee, to the extent insured by an agency of the federal or a state government; and
- (c) The Trustee is authorized to hold cash awaiting investment or distribution for a reasonable time and without liability for the payment of interest thereon.

Section 7. Commingling and Investment. The Trustee is expressly authorized in its discretion:

- (a) To transfer from time to time any or all of the assets of the Fund to any common, commingled, or collective trust fund created by the Trustee in which the Fund is eligible to participate, subject to all of the provisions thereof, to be commingled with the assets of other trusts participating therein; and
- (b) To purchase shares in any investment company registered under the Investment Company Act of 1940, 15 U.S.C. 80a-1 *et. seq.*, as amended, including one which may be created, managed, underwritten, or to which investment advice is rendered or the shares of which are sold by the Trustee. The Trustee may vote such shares in its discretion.

Section 8. Express Powers of the Trustee. Without in any way limiting the powers and discretions conferred upon the Trustee by the other provisions of this Agreement or by law, the Trustee is expressly authorized and empowered:

- (a) To sell, exchange, convey, transfer, or otherwise dispose of any property held by it, by public or private sale. No person dealing with the Trustee shall be bound to see the application of the purchase money or to inquire into the validity or expediency of any such sale or other disposition;
- (b) To make, execute, acknowledge, and deliver any and all documents of transfer and conveyance and any and all other instruments that may be necessary or appropriate to carry out the powers herein granted;
- (c) To register any securities held in the Fund in its own name or in the name of a nominee and to hold any security in bearer form or in book entry, or to combine certificates representing such securities with certificates of the same issue held by the Trustee in other fiduciary capacities, or to deposit or arrange for the deposit of such securities in a qualified central depository even though, when so deposited, such securities may be merged and held in bulk in the name of the nominee of such depository with other securities deposited therein by another person, or to deposit or arrange for the deposit of any securities issued by the United States Government, or any agency or instrumentality thereof, with a Federal Reserve Bank, but the books and records of the Trustee shall at all times show that all such securities are a part of the Fund;
- (d) To deposit cash in the Fund in interest bearing accounts maintained or savings certificates issued by the Trustee, in its separate corporate capacity, or in any other banking institution affiliated with the Trustee, to the extent insured by an agency of the federal or a state government; and
- (e) To compromise or otherwise adjust all claims in favor of or against the Fund.

Section 9. Taxes and Expenses. All taxes of any kind that may be assessed or levied against or in respect of the Fund and all brokerage commissions incurred by the Fund shall be paid from the Fund. All other expenses incurred by the Trustee in connection with the administration of this Trust, including fees for legal services rendered to the Trustee, the compensation of the Trustee to the extent not paid directly by the Grantor, and all other proper charges and disbursements of the Trustee shall be paid from the Fund.

Section 10. Annual Valuation. The Trustee shall annually furnish to the Grantor and to KDHE a statement confirming the value of the Fund held in trust. The valuation statement shall show the tax cost and current market value of the Fund as of the annual valuation date, and shall include a record of transactions since the preceding annual valuation date. The failure of the Grantor to object in writing to the Trustee within 90 days after the statement has been furnished to the Grantor and to KDHE shall constitute a conclusively binding assent by the Grantor, barring the Grantor from asserting any claim or liability against the Trustee with respect to matters disclosed in the statement. Annual valuation statements sent to KDHE shall be addressed to Kansas Department of Health and Environment, Bureau of Waste Management, at the bureau's current address.

Section 11. Advice of Counsel. The Trustee may from time to time consult with counsel to the Grantor, with respect to any question arising as to the construction of this Agreement or any action to be taken hereunder. The Trustee shall be fully protected, to the extent permitted by law, in acting upon the advice of counsel.

Section 12. Trustee Compensation. The Trustee shall be entitled to reasonable compensation for its services as agreed upon in writing from time to time with the Grantor.

Section 13. Successor Trustee. The Trustee may resign or the Grantor may replace the Trustee, but such resignation or replacement shall not be effective until the Grantor has appointed a successor trustee and this successor accepts the appointment. The successor trustee shall have the same powers and duties as those conferred upon the Trustee hereunder. Upon the successor trustee's acceptance of the appointment, the Trustee shall assign, transfer, and pay over to the successor trustee the funds and properties then constituting the Fund. If for any reason the Grantor cannot or does not act in the event of a resignation of the Trustee, the Trustee may apply to a court of competent jurisdiction for the appointment of a successor trustee or for instructions. The successor trustee shall specify the date on which it assumes administration of the trust in a writing sent to the Grantor, KDHE and the present Trustee by certified mail 10 days before such change becomes effective. Any expenses incurred by the Trustee as a result of any of the acts contemplated by this section shall be paid as provided in Section 9.

Section 14. Instructions to the Trustee. All orders, requests, and instructions by the Grantor to the Trustee shall be in writing, signed by such persons as are designated in the attached Exhibit A or such other designees as the Grantor may designate by amendment to Exhibit A. The Trustee shall be fully protected in acting without inquiry in accordance with the Grantor's orders, requests, and instructions, provided that the acts required by such orders, requests, and instructions are not contrary to this Agreement. All orders, requests, and instructions by KDHE shall be signed by the Secretary, KDHE, or his designate, and the Trustee shall be fully protected in acting in accordance with such orders, requests, and instructions. The Trustee shall have the right to assume, in the absence of written notice to the contrary, that no event constituting a change or a termination of the authority of any person to act on behalf of the Grantor or KDHE has occurred. The Trustee shall have no duty to act in the absence of such orders, requests, or instructions from the Grantor or KDHE, except as provided for herein.

Section 15. Notice of Nonpayment. The Trustee shall notify the Grantor and KDHE, by certified mail, within 10 days following the expiration of the 30 day period after the anniversary of the establishment of the Trust, if no payment is received from the Grantor during the preceding annual period. After the pay-in period is complete, KDHE shall notify the Trustee that it shall no longer be required to issue notices of nonpayment. Notices to KDHE shall be mailed to the Kansas Department of Health and Environment, Bureau of Waste Management, at the bureau's current address.

Section 16. Amendment of the Agreement. This Agreement may be amended by an instrument in writing executed by the Grantor, the Trustee, and KDHE, or by the Trustee and KDHE if the Grantor ceases to exist.

Section 17. Irrevocability and Termination. Subject to the right of the parties to amend this Agreement as provided in Section 16, this Trust shall be irrevocable and shall continue until terminated by the written agreement of the Grantor, the Trustee, and KDHE, or by the Trustee and KDHE if the Grantor ceases to exist. Upon termination of the Trust, all remaining trust property, less final administrative expenses, shall be delivered to the Grantor.

Section 18. Immunity and Indemnification. The Trustee shall not incur personal liability of any nature in connection with any act or omission, made in good faith, in the administration of this Trust, or in carrying out any directions by the Grantor or KDHE issued in accordance with this Agreement. The Trustee shall be indemnified and saved harmless by the Grantor or from the Trust Fund, or both, from and against any personal liability to which the Trustee may be subjected by reason of any act or conduct in its official capacity, including all expenses reasonably incurred in its defense in the event the Grantor fails to provide such defense.

Section 19. Choice of Law. This Agreement shall be administered, construed, and enforced according to the laws of the state of Kansas.

Section 20. Interpretation. As used in this Agreement, words in the singular include the plural and words in the plural include the singular. The descriptive headings for each Section of this Agreement shall not affect the interpretation or the legal efficacy of this Agreement.

In Witness Whereof, the parties have caused this Agreement to be executed by their respective officers duly authorized, and their corporate seals to be hereunder affixed and their signatures attested, as of the dates appearing by the signatures below.

SIGNED FOR THE GRANTOR

/s/ Thomas L. Rudy

Date 7/9/2015

Name Thomas L. Rudy

Title President, D&Z Kansas LLC

Seal

SIGNED FOR THE TRUSTEE

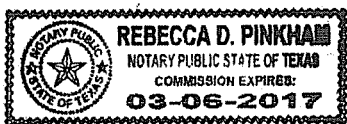
/s/ Robert L. Reynolds

Date 7/10/2015

Name Robert L. Reynolds

Title Vice President

Seal



Rebecca D. Pinkham

Signature Attested by the Notary

RICHARD A. FALVO
NOTARY PUBLIC
STATE OF RHODE ISLAND
MY COMMISSION EXPIRES 10/4/2015

Richard A. Falvo

Signature Attested by the Notary

SCHEDULE A TO THE TRUST AGREEMENT DATED JUNE 7, 2015

SCHEDULE A Amendment Date _____

THIS SCHEDULE A, being an attachment to the Trust Agreement made effective on the date first written above, identifies the hazardous waste facilities and cost estimates for closure(C), post-closure care(PC), or corrective action(CA), or any combination of these, for which financial assurance is provided herein.

Facility Name(s) and Address(es)	Permit # (s)	C, PC or CA	Cost Estimate(s)
Day & Zimmermann Kansas LLC 23102 Rush Road Parsons, KS 67357	KSR000511964	C, PC or CA	\$11,602,935

SCHEDULE B TO THE TRUST AGREEMENT DATED JUNE 7, 2015

SCHEDULE B Amendment Date_____

THIS SCHEDULE B, being an attachment to the Trust Agreement made effective on the date first written above, identifies the property transferred, or to be transferred, to the Fund if this is a funded trust fund; or, identifies the dedicated financial instrument which will be the source of monies deposited into the Fund, if this is a standby trust fund.

Identification of Funds or the Source of Funds	Amount(s)
Surety Bond Number K09101548 Westchester Fire Insurance Company 436 Walnut Street Philadelphia, PA 19106	\$11,602,935

EXHIBIT A TO THE TRUST AGREEMENT DATED JUNE 7, 2015

EXHIBIT A Amendment Date _____

THIS EXHIBIT A, being an attachment to the Trust Agreement made effective on the date first written above, identifies the officers of the Grantor who are authorized to provide written instructions to the Trustee.

Name(s)	Title(s)
Thomas L. Rudy Hwy 82 West P.O. Box 9100 Texarkana TX 75505-9100 (903) 255-2802	President, Day & Zimmermann Kansas LLC
James Estabrooks 1500 Spring Garden Philadelphia, PA (215) 299-8032	VP & Treasurer, Day & Zimmermann Kansas LLC
Sally L. Boulanger Hwy 82 West P.O. Box 9100 Texarkana, TX 75505-9100 (903) 255-2777	Director, Finance and Administration D&Z Munitions

APPENDIX I-5
INSURANCE CERTIFICATE

Endorsement No: 11
This endorsement, effective: March 15, 2015
(at 12:01 A.M. standard time at the address of the Named Insured as shown in Item 1. of the Declarations)
forms a part of Policy No: 0309-1566
Issued to: Day & Zimmermann Lone Star LLC
by: Allied World Assurance Company (U.S.) Inc.

ENDORSEMENT FOR LIABILITY

Name: Day & Zimmermann Kansas, LLC

Address: 23102 Rush Road Parsons, KS 67357

Policy Number: 0309-1566

Endorsement (if applicable): Endorsement For Liability

Period of Coverage: March 15, 2015 – August 15, 2015

Name of Insurer: Allied World Assurance Company (U.S.) Inc.
Address of Insurer: 199 Water Street, 24th Floor
New York, NY 10038

Name of Insured: Day & Zimmermann Kansas, LLC

Address of Insured: 23102 Rush Road Parsons, KS 67357

Certification:

1. This endorsement certifies that the policy to which the endorsement is attached provides liability insurance covering bodily injury and property damage in connection with the insured's obligation to demonstrate financial responsibility under 40 CFR 264.147 or 265.147. The coverage applies at

Facility ID / Registration	Address	City	State	Zip
Day & Zimmermann Kansas, LLC RCRA I.D. No.: KSR000511964	23102 Rush Road	Parsons	KS	67357

for sudden accidental occurrences. The limits of liability are \$1,000,000 "each occurrence" and \$2,000,000 "annual aggregate" limits of the Insurer's liability), exclusive of legal defense costs.

2. The insurance afforded with respect to such occurrences is subject to all of the terms and conditions of the policy; provided, however, that any provisions of the policy inconsistent with subsections (a) through (e) of this Paragraph 2 are hereby amended to conform with subsection (a) through (e):

(a) Bankruptcy or insolvency of the insured shall not relieve the Insurer of its obligations under the policy to which this endorsement is attached.

(b) The Insurer is liable for the payment of amounts within any deductible applicable to the policy, with a right of reimbursement by the insured for any such payment made by the Insurer. This provision does not apply with respect to that amount of any deductible for which coverage is demonstrated as specified in as specified in 40 CFR 264.147(f) or 265.147(f).


(c) Whenever requested by the Secretary, the Insurer agrees to furnish to the Secretary a signed duplicate original of the policy and all endorsements.

(d) Cancellation of this endorsement, whether by the Insurer, the insured, a parent corporation providing insurance coverage for its subsidiary, or by a firm having an insurable interest in and obtaining liability insurance on behalf of the owner or operator of the hazardous waste management facility, will be effective only upon written notice and only after the expiration of 60 days after a copy of such written notice is received by the Secretary.

(e) Any other termination of this endorsement will be effective only upon written notice and only after the expiration of thirty (30) days after a copy of such written notice is received by the Secretary.

Attached to and forming part of policy No. 0309-1566 issued by Allied World Assurance Company (U.S.) Inc., herein called the Insurer, of 199 Water Street, 24th Floor, New York, NY 10038 to Day & Zimmermann Kansas, LLC of 23102 Rush Road Parsons, KS 67357 this 15th day of March, 2015. The effective date of said policy is 15th day of August, 2014.

I hereby certify that the wording of this endorsement is identical to the wording specified in 40 CFR 264.151(i) and K.A.R. Article 31 as such regulation was constituted on the date first above written, and that the Insurer is licensed to transact the business of insurance, or eligible to provide insurance as an excess or surplus lines insurer, in one or more States.



Helen Eichmann

Vice President-Environmental

Authorized Representative of

Allied World Assurance Company (U.S.) Inc.

199 Water Street, 24th Floor,

New York, NY 10038

APPENDIX I-6

CHECKLIST FOR REVIEW OF FEDERAL RCRA PERMIT APPLICATION

CHECKLIST FOR REVIEW OF FEDERAL RCRA PERMIT APPLICATIONS**SECTION I. CLOSURE POST-CLOSURE PLANS AND FINANCIAL REQUIREMENTS**

Section and Requirement	Federal Regulation	Review Consideration^a	Location in Application^b	See Attached Comment Number^c
I-1 Closure Plans	270.14(b)(13)		Section I-1	
I-1a Closure Performance Standard	270.14(b)(13); 264.111	Describe how closure: minimizes the need for further maintenance; controls, minimizes, or eliminates the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere; and complies with the closure requirements of Subpart G and unit-specific closure requirements.	Section I-1a	
I-1b Time and Activities Required for Partial Closure and Final Closure Activities	270.14(b)(13); 264.112(b)(1) through 264.112(b)(7)	Describe the time and all activities required for: partial closure, if applicable; final closure; and maximum extent of operation that will be active during life of facility.	Section I-1b	
I-1c Maximum Waste Inventory	270.14(b)(13); 264.112(b)(3)		Section I-1c	
I-1d Schedule for Closure	270.14(b)(13); 264.112(b)(6)		Section I-1d	
I-1(d)(1) Time Allowed for Closure	270.14(b)(13); 264.112(b)(2); 264.113(a) and (b)		Section I-1d(1)	
I-1d(1)(a) Extension for Closure Time	270.14(b)(13); 264.113(a) and (b)		Section I-1d(1)(a)	
I-1e Closure Procedures	270.14(b)(13); 264.112; 264.114		Section I-1e	
I-1e(1) Inventory Removal	270.14(b)(13); 264.112(b)(3)	Discuss methods for removing, transporting, treating, storing, or disposing of all hazardous wastes and identify the type(s) of off-site hazardous waste management units to be used.	Section I-1e(1)	
I-1e(2) Disposal or Decontamination of Equipment, Structure, and Soils	270.14(b)(13); 264.112(b)(4); 264.114	Provide a detailed description of the steps needed to decontaminate or dispose of all facility equipment and structures. Demonstrate that any hazardous constituents (i.e., Appendix VII) left at the unit will not impact any environmental media in excess of Agency-established exposure levels and that direct contact will not pose a threat to human health and the environment.	Section I-1e(2)	
I-1e(3) Closure of Disposal Units/Contingent Closures	270.14(b)(13)		NA	

CHECKLIST FOR REVIEW OF FEDERAL RCRA PERMIT APPLICATIONS**SECTION I. CLOSURE POST-CLOSURE PLANS AND FINANCIAL REQUIREMENTS**

Section and Requirement	Federal Regulation	Review Consideration^a	Location in Application^b	See Attached Comment Number^c
I-1e(3)(a) Disposal Impoundments	270.14(b)(13); 264.228(a)(2)		NA	
I-1e(3)(a)(i) Elimination of Liquids	270.14(b)(13)		NA	
I-1e(3)(a)(ii) Waste Stabilization	270.14(b)(13); 264.228(a)(2)(ii)		NA	
I-1e(3)(b) Cover Design	270.14(b)(13); 264.228(a)(2)(iii); 264.310(a)		NA	
I-1e(3)(c) Minimization of Liquid Migration	270.14(b)(13); 264.228(a)(2)(iii)(A); 264.310(a)(1)	Draft RCRA Guidance Document entitled <u>Landfill (Design--Liner Systems and Final Cover)</u> (1982), suggests the following design for landfill cover systems (from top to bottom): a vegetated top cover, with a minimum of 24 inches of topsoil; a middle drainage layer (at least one foot thick with a saturated conductivity of not less than 1×10^{-3} cm/sec) overlain by a geotextile filter fabric or graded granular filter; and a low permeability bottom layer consisting of two components: an upper component of at least a 20 mil synthetic membrane protected above and below by at least six inches of bedding material, a lower component of at least 24 inches of low permeability (maximum hydraulic conductivity of 1×10^{-7} cm/sec) soil emplaced in lifts not exceeding six inches. For cover designs different than EPA-recommended designs, provide engineering calculations showing the proposed cover will provide long-term minimization of liquid migration through the cover.	NA	
I-1e(3)(d) Maintenance Needs	270.14(b)(13); 264.228(a)(2)(iii)(B); 264.310(a)(2)		NA	
I-1e(3)(e) Drainage and Erosion	270.14(b)(13); 264.228(a)(2)(iii)(C); 264.310(a)(3)	The following information should be provided: data demonstrating that the proposed final slopes will not cause significant cover erosion; description of drainage materials and their permeabilities; engineering calculations demonstrating free drainage of precipitation off of and out of the cover; and estimation of the potential for drainage-layer clogging.	NA	
I-1e(3)(f) Settlement and Subsidence	270.14(b)(13); 264.228(a)(2)(iii)(D); 264.310(a)(4)	Include the following information: potential foundation compression; potential soil liner compression; and potential waste consolidation and compression resulting from waste dewatering, biological oxidation and chemical conversion of solids to liquids.	NA	
I-1e(3)(g) Cover Permeability	270.14(b)(13); 264.228(a)(2)(iii)(E); 264.310(a)(5)		NA	

CHECKLIST FOR REVIEW OF FEDERAL RCRA PERMIT APPLICATIONS**SECTION I. CLOSURE POST-CLOSURE PLANS AND FINANCIAL REQUIREMENTS**

Section and Requirement	Federal Regulation	Review Consideration^a	Location in Application^b	See Attached Comment Number^c
I-1e(3)(h) Freeze/Thaw Effects	270.14(b)(13); 264.228(a)(2)(iii); 264.310(a)	Identify the average depth of frost penetration and describe the effects of freeze/thaw cycles on the cover.	NA	
I-1e(4) Closure of Containers	270.14(b)(13); 264.178; 264.112(b)(3); 270.14(b)(13)	Address the following: hazardous waste removal and disposal; container decontamination and disposal; site decontamination and disposal including linings, soil, and washes; maximum inventory.	Section I-1e(4)	
I-1e(5) Closure of Tanks	270.14(b)(13); 264.197; 264.112(b)(3)	The description should address the following: waste removal from tanks and equipment; decontamination of all components; verification of decontamination; disposal of wastes and residues; and maximum inventory.	NA	
I-1e(6) Closure of Waste Piles	270.14(b)(13); 270.18(h); 264.258	The description must address the following: procedure and criteria for determining whether or not decontamination has been successful; and sampling and analytical techniques.	NA	
I-1e(7) Closure of Surface Impoundments	270.14(b)(13); 270.17(f); 264.228(a)(1), (2), and (b)	Surface impoundments without liners or with liners that do not meet the requirements must also provide contingent plans for closure in place and a contingent post-closure plan, except for impoundments requesting a liner exemption in accordance with D-4b.	NA	
I-1e(8) Closure of Incinerators	270.14(b)(13); 264.351	Describe how, at closure, all hazardous waste and hazardous waste residues (including, but not limited to, ash, scrubber waters, and scrubber sludges) will be removed from the incinerator, associated ductwork, piping, air pollution control equipment, sumps, and any other structures or operating equipment such as pumps, valves, etc., that have come into contact with the hazardous waste. Alternatively, describe how the incinerator and associated units and equipment will be dismantled and disposed of as a hazardous waste.	NA	
I-1e(9) Closure of Landfills	270.14(b)(13); 270.21(e); 264.310(a)	Provide detailed plans and engineering report that describes the final cover components in detail. Cover installation and construction quality assurance procedures should be thoroughly described.	NA	
I-1e(10) Closure of Land Treatment Facilities	270.14(b)(13); 264.280(a); 270.20(f)		NA	
I-1e(10)(a) Continuance of Treatment	270.14(b)(13); 264.280(a)(1) through (7)		NA	
I-1e(10)(b) Vegetative Cover	270.14(b)(13); 270.20(f); 264.280(a)(8)		NA	

CHECKLIST FOR REVIEW OF FEDERAL RCRA PERMIT APPLICATIONS**SECTION I. CLOSURE POST-CLOSURE PLANS AND FINANCIAL REQUIREMENTS**

Section and Requirement		Federal Regulation	Review Consideration ^a	Location in Application ^b	See Attached Comment Number ^c
I-1e(11)	Closure of Miscellaneous Units	270.14(b)(13); 270.23(a)(2)		Section I-1e(11)	
I-1e(12)	Closure of Boilers and Industrial Furnaces	270.14(b)(13); 266.102(a)(2)(vii)	Describe how, at closure, all hazardous waste and hazardous waste residues (including, but not limited to, ash, scrubber waters, and scrubber sludges) will be removed from the BIF unit, associated ductwork, piping, air pollution control equipment, sumps and any other structures or operating equipment such as pumps, valves, etc., that have come into contact with hazardous wastes. Alternatively, describe how the BIF and associated equipment will be dismantled and disposed of. If any wastes, waste residues, contaminated components, subsoils, structures or equipment remain after closure, provide plans for closing the BIF unit as a landfill and provide a post-closure care plan.	NA	
I-1e(13)	Closure of Containment Buildings	270.14(b)(13); 264.1102	Show that at closure all hazardous waste, hazardous waste residues, contaminated containment system, contaminated subsoils, and all structures and equipment contaminated with waste and leachate will be removed. If any wastes, waste residues, contaminated components, subsoils, structures or equipment remain after closure, provide plans for closing the containment building as a landfill and provide a post-closure care plan.	Section I-1e(13)	
I-2	Post-Closure Plans	270.14(b)(13)		Section I-2	
I-2a	Inspection Plan	270.14(b)(13); 264.118(a); 264.197(b); 264.197(c)(2); 264.226(d)(2); 264.228(b); 264.228(c)(1)(ii); 264.258(b); 264.258 (c)(1)(ii); 264.303(c); 264.310(b)	Rationale for determining the length of time between inspections should be provided.	NA	
I-2b	Monitoring Plan	270.14(b)(13); 264.118(b)(1); 264.197(b); 264.197(c)(2); 264.226(d)(2); 264.228(b); 264.228(c)(1)(ii); 264.258(b); 264.258 (c)(1)(ii); 264.303(c); 264.310(b)		NA	

CHECKLIST FOR REVIEW OF FEDERAL RCRA PERMIT APPLICATIONS**SECTION I. CLOSURE POST-CLOSURE PLANS AND FINANCIAL REQUIREMENTS**

Section and Requirement	Federal Regulation	Review Consideration^a	Location in Application^b	See Attached Comment Number^c
I-2c Maintenance Plan	270.14(b)(13); 264.118(b)(2); 264.197(b); 264.197(c)(2); 264.228(b); 264.228(c)(1)(ii); 264.258(b); 264.258(c)(1)(ii); 264.310(b)	Describe the preventative and corrective maintenance procedures, equipment procedures, equipment requirements and material needs.	NA	
I-2d Land Treatment	270.14(b)(13); 264.280(c)	Describe the operation, inspection, and maintenance programs to be used at the closed facility.	NA	
I-2e Post-Closure Care for Miscellaneous Units	270.14(b)(13); 270.23(a)(3); 264.603		NA	
I-2f Post-Closure Security	270.14(b)(13); 264.117(b) and (c)	Demonstrate that for property where hazardous wastes remain after partial or final closure, post-closure use must never be allowed to disturb the integrity of the final cover, liner(s), or any other components of the containment system, or the function of the facility's monitoring system.	NA	
I-2g Post-Closure Contact	270.14(b)(13); 264.118(b)(3)		NA	
I-3 Notices Required for Disposal Facilities	270.14(b)(13)		Section I-3	
I-3a Certification of Closure	270.14(b)(13); 264.115; 264.280		Section I-3a	
I-3b Survey Plat	270.14(b)(13); 264.116		Section I-3b	
I-3c Post-Closure Certification	270.14(b)(13); 264.120		Section I-3c	
I-3d Post-Closure Notices	270.14(b)(13); 270.14(b)(14); 264.119		NA	
I-4 Closure Cost Estimate	270.14(b)(15); 264.142	Estimate must equal final cost estimate. Estimate must be based on third party closing facility and may use on-site disposal if capacity will exist over life of facility. Estimate must be adjusted for annual inflation as stated in 264.142(b). Estimates may not assume zero cost for hazardous waste handling, and may not incorporate salvage value, facility structures/equipment, land, or other facility assets as offsets.	Section I-4	

CHECKLIST FOR REVIEW OF FEDERAL RCRA PERMIT APPLICATIONS**SECTION I. CLOSURE POST-CLOSURE PLANS AND FINANCIAL REQUIREMENTS**

Section and Requirement	Federal Regulation	Review Consideration^a	Location in Application^b	See Attached Comment Number^c
I-5 Financial Assurance for Closure	270.14(b)(15); 264.143; 264.151		Section I-5	
I-5a Closure Trust Fund	270.14(b)(15); 264.143(a); 264.151(a)(1)	Provide copy of fund agreement.	NA	
I-5b Surety Bond	270.14(b)(15); 264.143(b),(c); 264.151 (b),(c)		I-5b	
I-5b(1) Surety Bond Guaranteeing Payment into a Closure Trust Fund	270.14(b)(15); 264.143(b); 264.151(b)	Must provide bond or standby trust agreement. Bond must guarantee owner/operator will fund standby trust fund or provide financial assurance equal to penal sum.	I-5b(1)	
I-5b(2) Surety Bond Guaranteeing Performance of Closure	270.14(b)(15); 264.143(c); 264.151(c)	Guarantee owner/operator will perform closure required as worded in 246.151(c) and Subpart G.	I-5b(2)	
I-5(c) Closure Letter of Credit	270.14(b)(15); 264.143(d); 264.151(d)	Requires letter of credit for 1 year equal to amount of closure.	NA	
I-5(d) Closure Insurance	270.14(b)(15); 264.143(e); 264.151(e)	Provide copy of certificate of insurance, wording requirement found in 264.151(e).	NA	
I-5(e) Financial Test and Corporate Guarantee for Closure	270.14(b)(15); 264.143(f); 264.151(f),(h)	Signed letter by owner/operator or chief financial officer as specified in 264.151(f),(h) of applicant financial statement. If a parent corporation is guaranteeing closure care, corporate guarantee must accompany.	NA	
I-5(f) Use of Multiple Financial Mechanism	270.14(b)(15); 264.143(g)	Financial assurance instruments must meet requirements stated in 264.143 (a),(b),(c),(d) or (e) that include trust funds, surety bonds, letter of credit, and insurance, respectively.	NA	
I-5(g) Use of Multiple Financial Mechanism for Multiple Facilities	270.14(b)(15); 264.143(h)	Provide financial assurance mechanism showing amount of funds assured.	NA	
I-6 Post-Closure Cost Estimate	270.14(b)(16); 264.144	Estimate must be based on third party closing facility and may use on-site disposal if capacity will exist over life of facility. Estimate must be adjusted for annual inflation as stated in 264.142(b).	NA	

CHECKLIST FOR REVIEW OF FEDERAL RCRA PERMIT APPLICATIONS**SECTION I. CLOSURE POST-CLOSURE PLANS AND FINANCIAL REQUIREMENTS**

Section and Requirement		Federal Regulation	Review Consideration ^a	Location in Application ^b	See Attached Comment Number ^c
I-7	Financial Assurance Mechanism for Post Closure Care	270.14(b)(16); 264.145; 264.151		NA	
I-7a	Post-Closure Trust Fund	270.14(b)(16); 264.145(a); 264.151(a)(1)	Provide copy of post-closure fund agreement. Wording requirements outlined in 264.151(a)(1).	NA	
I-7b	Surety Bond	270.14(b)(16); 264.145(b),(c); 264.151(b),(c)	264.145(b),(c) spells out requests for owner/ operator for adjusting estimates, inflation, and reporting to regional administrator. 264.151(b),(c) outlines wording for bond agreement.	NA	
I-7b(1)	Surety Bond Guaranteeing Payment into a Post-Closure Trust Fund	270.14(b)(16); 264.145(b); 264.151(b)	Must provide bond or standby trust agreement before beginning final closure of the facility. Bond must guarantee owner/operator will fund a standby trust fund or provide financial assurance equal to penal sum.	NA	
I-7b(2)	Surety Bond Guaranteeing Performance of Closure	270.14(b)(16); 264.145(c); 264.151(c)	Guarantee owner/operator will perform closure required as stated in 246.151(c) and Subpart H.	NA	
I-7(c)	Post-Closure Letter of Credit	270.14(b)(16); 264.145(d); 264.151(d)	Requires letter of credit for 1 year equal to amount of post-closure cost.	NA	
I-7(d)	Post-Closure Insurance	270.14(b)(16); 264.145(e); 264.151(e)	Provide copy of certificate of insurance, wording requirement found in 264.151(e).	NA	
I-7(e)	Financial Test and Corporate Guarantee for Post-Closure Care	270.14(b)(16); 264.145(f); 264.151(f),(h)	Signed letter by owner/operator or chief financial officer as specified in 264.151(f),(h) of applicant financial statement. If parent corporation is guaranteeing post-closure care, corporate guarantee must accompany.	NA	
I-7(f)	Use of Multiple Financial Mechanism	270.14(b)(16); 264.145(g)	Provide copy of financial assurance mechanisms. Combined financial assurance must be at least equal to post-closure cost estimate.	NA	
I-7(g)	Use of Multiple Financial Mechanism for Multiple Facilities	270.14(b)(16); 264.145(h)	Provide copy of financial assurance mechanisms for more than one facility. Amount must be no less than sum of funds that would be available if separate mechanism had been established and maintained for each facility.	NA	
I-8	Liability Requirements	270.14(b)(17); 264.147		NA	

CHECKLIST FOR REVIEW OF FEDERAL RCRA PERMIT APPLICATIONS**SECTION I. CLOSURE POST-CLOSURE PLANS AND FINANCIAL REQUIREMENTS**

Section and Requirement		Federal Regulation	Review Consideration^a	Location in Application^b	See Attached Comment Number^c
I-8a	Coverage for Sudden Accidental Occurrences	270.14(b)(17); 264.147(a)	Coverage must be maintained for sudden accidental occurrences in the amount of \$1 million per occurrence with an annual agreement of at least \$2 million.	NA	
I-8a(1)	Endorsement of Certification	270.14(b)(17); 264.147(a)(1)	Submit original Hazardous Waste Facility Liability Endorsement wording pursuant to 264.151(i), or Certificate of Liability wording pursuant to 264.151(j).	NA	
I-8a(2)	Financial Test and Corporate Guarantee for Liability Coverage	270.14(b)(17); 264.147(a)(2), (f),(g); 264.151(f),(g)	Requires signed letter by owner or chief financial officer worded as outlined in 264.151(g) outlining applicant financial statement. 264.151(g) used if applicant is using financial test to cover cost for closure or post closure. Alternatively, owner/operator may submit corporate guarantee specified in 264.151(h)(2).	NA	
I-8a(3)	Use of Multiple Financial Mechanism	270.14(b)(17); 264.147(a)(3)	Submit items demonstrating liability coverage specified in I-8a(1) and I-8a(2). Amount of coverage must total at least minimum amount required by 264.147(a).	NA	
I-8b	Coverage for Nonsudden Accidental Occurrences	270.14(b)(17); 264.147(b)	For high risk storage facilities, surface impoundments, land disposal, land treatment facilities, liability coverage must be maintained in the amount of at least \$3 million per occurrence. Annual aggregate at least \$6 million.	I-8	
I-8b(1)	Endorsement or Certification	270.14(b)(17); 264.147(b)(1)	Submit signed duplicate original of Hazardous Waste Facility Liability Endorsement.	I-8a(1)	
I-8b(2)	Financial Test or Corporate Guarantee for Liability Coverage	270.14(b)(17); 264.147(b)(2); 264.151(f),(g)	Requires signed letter by owner or chief financial officer worded as outlined in 264.151(g) outlining applicant financial statement. 264.151(g) used if applicant is using financial test to cover cost for closure or post closure. Alternatively, owner/operator may submit corporate guarantee specified in 264.151(h)(2).	NA	
I-8b(3)	Use of Multiple Insurance Mechanism	270.14(b)(17); 264.147(b)(3)	Submit items demonstrating liability coverage specified in I-8a(1) and I-8a(2). Amount of coverage must total at least minimum amount required by 264.147(b).	NA	
I-8c	Requests for Variance	270.14(b)(17); 264.147(c)	Request for adjusted level of required liability must be supported by information which demonstrates 264.147(a) or (b) are not consistent with degree and duration of risk associated with treatment, storage, or disposal at facility or group of facilities.	NA	
I-9	Use of State Required Mechanisms	270.14(b)(18)		NA	

CHECKLIST FOR REVIEW OF FEDERAL RCRA PERMIT APPLICATIONS**SECTION I. CLOSURE POST-CLOSURE PLANS AND FINANCIAL REQUIREMENTS**

Section and Requirement		Federal Regulation	Review Consideration^a	Location in Application^b	See Attached Comment Number^c
I-9a	Use of State Required Mechanisms	270.14(b)(18); 264.149	When state has regulations equivalent or greater liability requirements for financial assurance for closure post-closure submit copy of state-required financial mechanism.	NA	
I-9b	State Assumption of Responsibility	270.14(b)(18); 264.150	If state assumes legal responsibility for compliance with closure, post-closure, or liability requirements there must be a letter submitted from state specifying assumption of responsibilities and amounts of liability.	NA	

Notes:

^a Considerations in addition to the requirements presented in the regulations.^b For each requirement, this column must indicate one of the following: NA for not applicable, IM for information missing, or the exact location of the information in the application.^c If application is deficient in an area, prepare a comment describing the deficiency, attach it to the checklist, and reference the comment in this column.